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Universal Input Meter

Operator's Manual

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⚠ This device is marked with the international caution symbol. It is important to read the Setup Guide before installing or commissioning this device as it contains important information relating to safety and EMC.

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Notes, Warnings, and Cautions

Information that is especially important to note is identified by these labels:

- **NOTE**
- **WARNING**
- **CAUTION**
- **IMPORTANT**

NOTE: provides you with information that is important to successfully setup and use the Programmable Digital Meter.

CAUTION or WARNING: tells you about the risk of electric shock.

CAUTION, WARNING or IMPORTANT: tells you of circumstances or practices that can effect the meter's functionality and must refer to accompanying documents.

Notes

1.1 Description

This versatile ultra high-performance meter handles a broad spectrum of dc voltage and current ranges, nine thermocouple types, multiple RTD's, and signals from strain gauge transducers such as load cells and pressure transducers, as well as potentiometric inputs. It also features ten point linearization of input signals, progammable by the user for custom applications.

Built-in excitation to power virtually any sensor or transmitter, and four isolated open collector outputs for control or alarms are standard. The big, bright, 6-digit patented LED display can be programmed to change color between Red, Amber, and Green at any setpoint. Output options include: Isolated programmable analog voltage or current and four relays.

With the Serial Communications option, the user can select from a push-button menu between RS-232, RS-485, and either a straightforward ASCII protocol or MODBUS. With our award-winning Ethernet/Internet option, this unit connects directly to an Ethernet network and transmits data in standard TCP/IP protocol. It is possible to monitor and control a process through a web browser from anywhere on the Internet.

1.2 Features

- Accuracy: up to ±0.005% of reading
- 6-Digit Color Changing LED Display
- Up to 166 Readings Per Second
- 10 Point Linearization
- 4 Isolated Open Collector Output
- Isolated Analog Output, Optional
- Four Relays, Optional
- Ethernet or RS-232/RS-485, Optional
- In-Line Calibration
- NEMA 4 Front Bezel

1 Introduction

1.3 Available Options and Accessories

The following options are available. Optional boards are either installed at the time of purchase, or available as separate items and installed by the user after purchase.

-T/C	Thermocouple Temperature Compensation Connector Kit
-4R	Four Form-C SPDT Relay Output Board
-A	Isolated 14 bit Analog Output Board
-C24	Serial Communications RS-232* + RS-485** + MODBUS
-EI	Ethernet/Internet

Note

Choose between Ethernet or Serial Communication option per meter. Serial communications come with one 6 ft. communications cable with phone plug termination. **Configuration Software and latest Operational Manual are available at the website listed in this manual.**

* Recommend purchase of 9SC2 or 25SC2 (see OPTIONS below)

** Recommend purchase of 9SC4 or 25SC4 (see OPTIONS below)

MODEL NUMBER	DESCRIPTION
FS	Custom Calibration/configuration
BL	Blank lens
9SC2	9-pin Serial Connector for RS-232
9SC4	9-pin Serial Connector for RS-485
25SC2	25-pin Serial Connector for RS-232
25SC4	25-pin Serial Connector for RS-485
RP18	19” Rack panel for one (1) meter
RP28	19” Rack panel for two (2) meters
RP38	19” Rack panel for three (3) meters
SPC4	1/8 DIN NEMA 4 heavy duty cover with thumb screws
SPC18	1/8 DIN NEMA 4 Splash Proof lens cover
TP1	Trimplate adapter

1.4 Modes of Operation

- This unit has two different modes of operation.
  The first, Run Mode, is used to display values for the process variable, and to display or clear peak and valley values. The other mode, Menu Configuration Mode, is used to navigate through the menu options and configure the controller. **Section 10** of this manual will explain the Menu Configuration Mode.
- For your unit to operate properly, the user must first "program" or configure the menu options along with the **Jumper Settings Configuration** accordingly. For detail and illustration, refer the Configuration Jumper Settings **Section 6**.
- This unit can be configured via either "**MENU 1**" factory default, modernized menu.
  or
  "**MENU 2**", “older-style”, identical to previous INFT, INFS, INFP or DP41 menus, to support our past customers, if they prefer to use older-style menu navigation.
- Access Security can also help user rapidly navigate to the routine setup menu by skipping infrequently accessed menus, and menus that were intentionally locked to prevent unauthorized tampering with setup parameters.

2 Unpacking

Unpack all items and make sure that every item on the packing list is present. The items you should receive are listed below. If something is missing, use the phone number, listed in this manual, for the Customer Service Department nearest you.

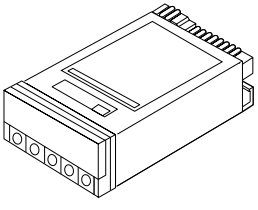
Also, inspect the shipping container and enclosed equipment for any signs of damage. Take particular note of any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

Note The shipping agent will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save all packing material and containers in the event that reshipment is required.

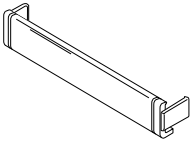
When you ordered your meter, you will receive the following items in the shipping box:

QTY DESCRIPTION

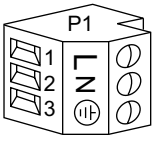
1 Unit in a Mounting Sleeve with Gasket



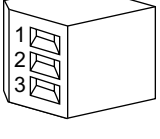
1 Front-Panel Button Cover



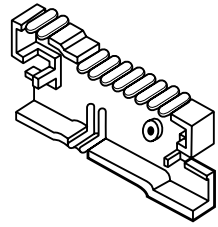
1 AC Power Connector (orange - P1)



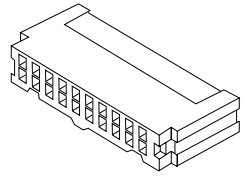
2 Input Connectors (gray - P3 and P9)



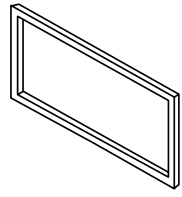
1 Rear Protective Cover with Screw



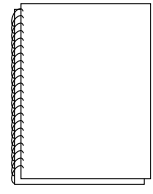
1 20-Socket Ribbon Connector (P2 Connector)



2 Panel-Mounting Gaskets (1 Spare)



1 Operator's Manual



Other items may also be in the box depending on the options ordered. Refer to specific options as described previously.

3 Safety Considerations

3.1 SAFETY CONSIDERATIONS

This device is marked with the international caution symbol. It is important to read this manual before installing or commissioning this device as it contains important information relating to Safety and EMC (Electromagnetic Compatibility).

Unpacking & Inspection

Unpack the instrument and inspect for obvious shipping damage. Do not attempt to operate the unit if damage is found.

This instrument is a panel mount device protected in accordance with Class I of EN 61010 (90-240 Vac power connections). Installation of this instrument should be done by Qualified personnel. In order to ensure safe operation, the following instructions should be followed.

This instrument has no power-on switch. An external switch or circuit-breaker shall be included in the building installation as a disconnecting device. It shall be marked to indicate this function, and it shall be in close proximity to the equipment within easy reach of the operator. The switch or circuit-breaker shall not interrupt the Protective Conductor (Earth wire), and it shall meet the relevant requirements of IEC 947–1 and IEC 947-3 (International Electrotechnical Commission). The switch shall not be incorporated in the mains supply cord.

Furthermore, to provide protection against excessive energy being drawn from the mains supply in case of a fault in the equipment, an overcurrent protection device shall be installed.

- The Protective Conductor must be connected for safety reasons. Check that the power cable has the proper Earth wire, and it is properly connected. It is not safe to operate this unit without the Protective Conductor Terminal connected.

- Do not exceed voltage rating on the label located on the top of the instrument housing.
- Always disconnect power before changing signal and power connections.
- Do not use this instrument on a work bench without its case for safety reasons.
- Do not operate this instrument in flammable or explosive atmospheres.
- Do not expose this instrument to rain or moisture.
- Unit mounting should allow for adequate ventilation to ensure instrument does not exceed operating temperature rating.
- Use electrical wires with adequate size to handle mechanical strain and power requirements. Install without exposing bare wire outside the connector to minimize electrical shock hazards.

EMC Considerations

- Whenever EMC is an issue, always use shielded cables.
- Never run signal and power wires in the same conduit.
- Use signal wire connections with twisted-pair cables.
- Install Ferrite Bead(s) on signal wires close to the instrument if EMC problems persist.

4.1 FRONT OF THE METER

The following is a brief description of each part of the front of the meter.

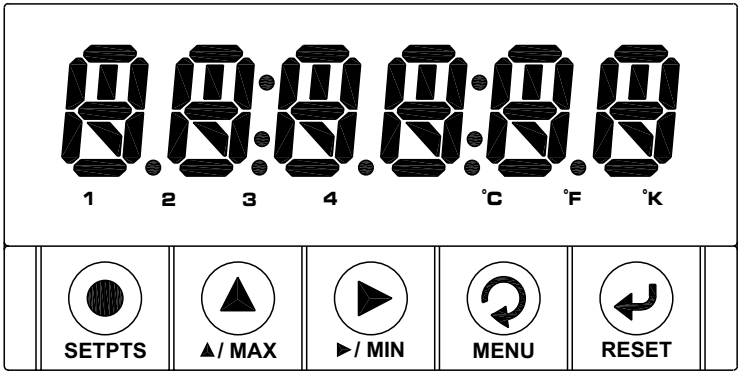


Figure 4-1. Front Detail

ITEM	DESCRIPTION
1	–.8.8.8.8.8 or 8.8.8.8.8.8 6-digit, 9 segment, alphanumeric 0.68” high LED display with programmable decimal point.
2	SETPOINT LED These LEDs, labeled 1 through 4, display the status of setpoints. 1 (Setpoint 1) 2 (Setpoint 2) 3 (Alarm 1) 4 (Alarm 2)
3	UNIT OF DEGREE LED These LEDs, labeled ˚C, ˚F and ˚K display the status in Celcius, Fahrenheit or Kelvin.
4	5 Pushbuttons

4 Parts of the Meter

BUTTON	Function in Configuration Mode
SETPTS	• This button functions only in Run Mode. When the Setpoint/Alarm features are unlocked, pressing this button sequentially recalls the previous setpoint settings to the display. After the '**▶/MIN**' and '**▲/MAX**' buttons are used to alter those values, as desired, pressing the '**SETPTS**' button again, stores these new values. • At any step within this Setpoint Settings Mode, each of the four setpoint values are displayed for approximately 10 seconds after the last press of any of the '**SETPTS**', '**▶/MIN**' and **'▲/MAX'** buttons.
▲/MAX	• Press the up '**▲/MAX**' button to scroll through "flashing" selections. If the function requires a numerical value to be entered and displayed, press this key to increase value of a parameter that is currently being modified. The **" - "** Minus sign will be available at the first digit from left side of display. • In the Run Mode, pressing the '**▲/MAX**' button causes the display to flash the PEAK **"HI RdG"** Reading value – press again to return to the Run Mode.
▶/MIN	• Press the '**▶/MIN**' button to go back to a previous Level Menu item, or Run Mode if the last menu was one of Main Menu items. • Press this button twice to back up further to the Main Menu item (Main Menu) or Run Mode, if the last menu was the submenu of the Main Menu item, in Menu Configuration Mode. • Press this button three times in Menu Configuration Mode as necessary to reset the controller to the Run Mode. • When a numerical value is flashing, press this button to step through digits from left to right, allowing the user to select the desired digit to modify. If all digits are not flashing and decimal point is, press '**▲/MAX**' to select decimal point position to display it (or even without decimal point appearance due to the nature of LED display in the last operation). • In the Run Mode pressing the '**▶/MIN**' causes the display to flash the VALLEY **"LO RdG"** reading value – press again to return to the Run Mode.

BUTTON	Function in Configuration Mode
MENU	• To enter the Menu, the user must first press '**MENU**' button. • To select "older -style" of Menu Configuration, "**MENU 2**", press '**MENU**' button while Display is showing Firmware Version Number and only after applying the power. Use '▲**/MAX**' to select "**MENU 2**" or "**MENU 1**" the default modern Menu Navigation option. Press '**MENU**' button again to store your Menu selection. Note: If "**MENU 2**" is selected, users will be prompted to choose one of these three available Display Colors: "**GREEN**", "**AMbER**" or "**REd**". • Use this button to advance/navigate to the next menu item. The user can navigate through all the top-level menus by pressing "**MENU**" repeatedly. • While a parameter is being modified, press this button to escape without saving the parameter.
ENTER	• Press this button to access the submenus from a Top Level Menu item. • Press this button, to store a submenu selection, or after Entering a selected value/state - the display will flash a "**StOREd**" message to confirm your selection. • In Menu Configuration Mode, pressing this button repeatedly also allow user to sequence and confirm all settings through entire setup menu items. • In the Run Mode, pressing the '**RESET/ENTER**' button once erases the memories of Peak "**HI RdG**", Valley "**LO RdG**" reading values, and Alarm Latches. The display shows "**RESEt 1**" momentarily then returns to Run Mode. • In the Run Mode, pressing '**RESET/ENTER**' button twice, will cause a hardware reset, as display shows "**RESEt 2**".
Note	• Reset: Except for Set Points and the Alarms, modifying any settings of the menu configuration will reset ("**RESEt 2**") the unit prior to resuming Run Mode. • Every Menu underlined item, number, or state is the Factory default/preset value. Example: 001, 002, 004 • Make certain that the unit has no locked menu Before attempting to locate and configure the specific menu function.

4 Parts of the Meter

4.2 REAR OF THE METER

The following is a brief description of each part of the rear of the meter. The labeling on the top of the mounting sleeve (not the case) identifies the location of the connectors found at the rear of the meter. **Figure 4-2** shows this labeling.

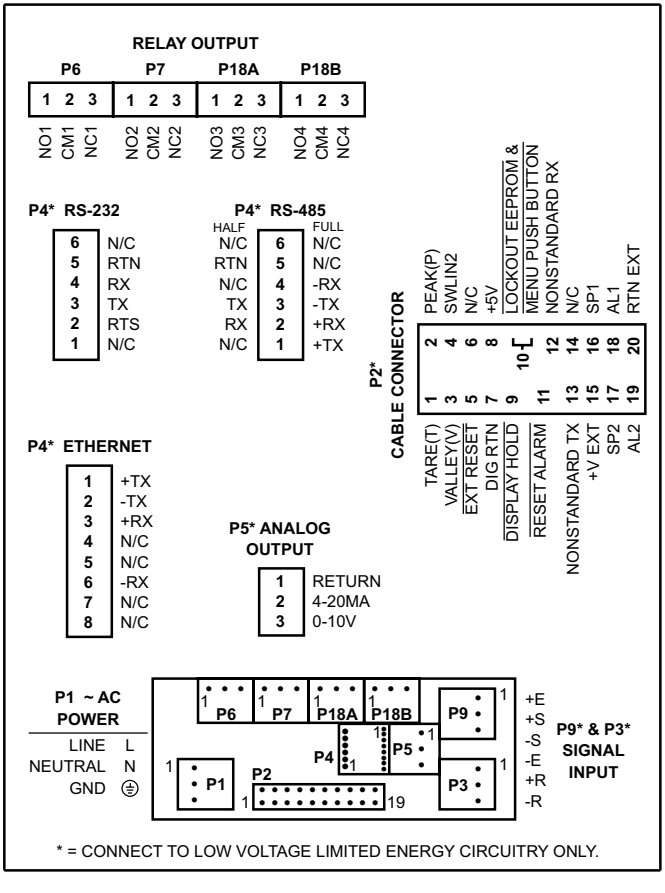


Figure 4-2. AC Power - Connector Labeling for Rear Connectors

Figure 4-3 shows the rear of the meter with the optional 4-relay output board, ethernet board and analog output board installed.

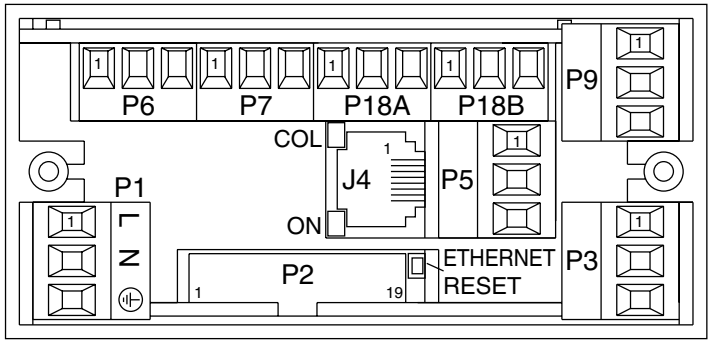


Figure 4-3. Rear View

CONNECTOR #	DESCRIPTION
P1	AC Power Connector
P2	External I/O Connector
P3	Input Connector
J4	Optional RS-232/RS-485 or Ethernet Connector
P5	Optional Analog Output Connector
P6	Optional Form-C Relay #1 Connector
P7	Optional Form-C Relay #2 Connector
P9	Input Connector
P18A	Optional Form-C Relay #3 Connector
P18B	Optional Form-C Relay #4 Connector

Table 4-1. Rear Connector Descriptions

5 Setup

5.1 CONDITIONS REQUIRING DISASSEMBLY

You may need to remove the sleeve or open the unit for several reasons:

1. To inspect the rating label on the case (**Section 5.2.1**).
2. To install optional output board(s) (**Section 5.2.2**).
3. To mount the unit in a panel (**Section 5.2.4**).

5.2 ASSEMBLY/DISASSEMBLY

OPENING THE UNIT

Your unit is fully assembled, but not wired. See **Section 7** for wiring connection for power and sensor inputs. In most cases, if you have ordered optional boards with the meter, these boards will already be installed.

You will need to remove only the rear cover to complete wiring, but you will have to open the meter to do one or more of the following:

a. Install optional boards. See **Section 5.2.2**.

b. Access jumpers on the Main and optional boards. See **Section 5.2.3**.

WARNING!: You must disconnect and turn-off the power and connector signals before accessing the unit and installing optional boards. Failure to do so may result in injury!

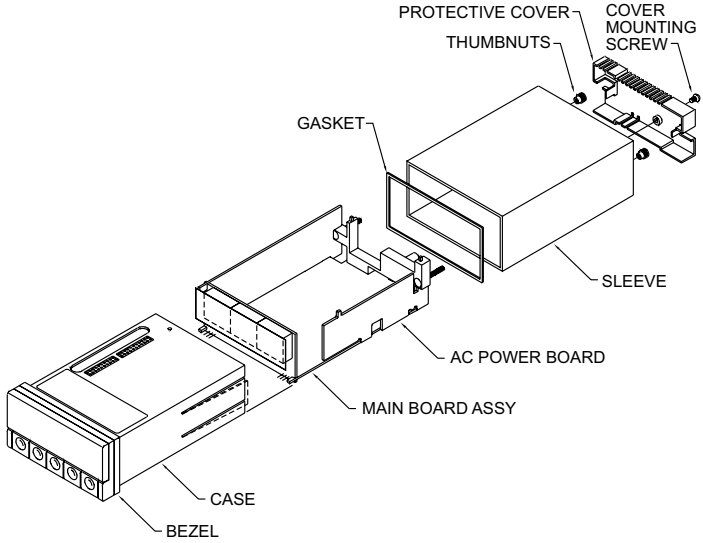


Figure 5-1. Meter Exploded View

Using **Figures 5-1** as a guide, follow these simple instructions to open the unit:

IMPORTANT: Turn-off the power and input signals from the unit before proceeding. Failure to do so may result in injury!

1. Remove the cover mounting screw that secures the rear protective cover to the unit, and remove the Rear Protective Cover.

   If you are simply wiring the unit –but not checking jumpers or installing or removing boards–this is as far as the unit needs to be disassembled. Go to **Section 5.2.1**.

2. Remove all wiring connectors from the rear of the unit.
3. Remove the two thumbnuts that secure the case to the sleeve.
4. Remove the sleeve completely by sliding it back from the front bezel.
5. Using **Figure 5-2** as a guide, bend the side-panel detents on the case outward and pull the board assembly out of the case by the mounting screw stem.

Note From this point forward, these 5 steps are referred to as "**Reveal the main board**".

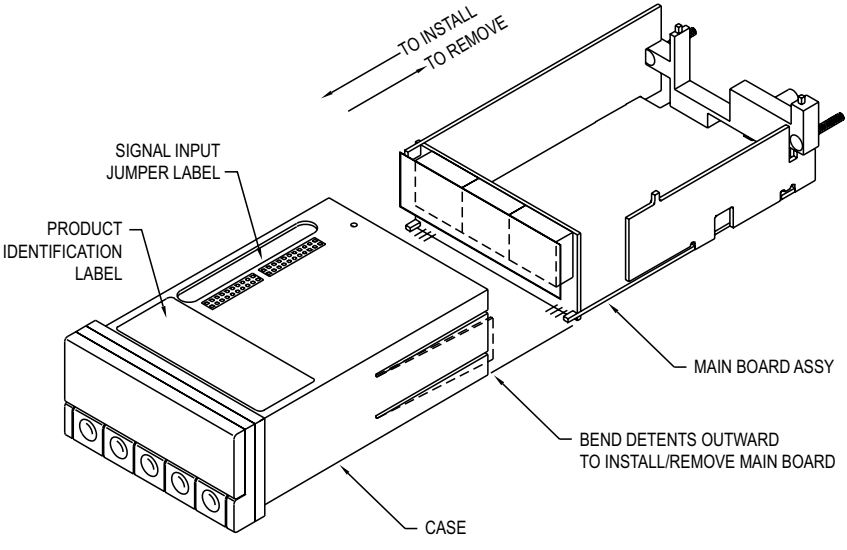


Figure 5-2. Board Assembly Removing/Installing Detail

The meter is now disassembled to the point where you can check and configure jumpers and install option boards.

REINSERTING THE MAIN BOARD ASSEMBLY INTO THE CASE

Reinsert the Main Board into the case once jumpers and optional boards have been configured and installed.

Spread the side-panel detents of the case, see **Figure 5-2**, and carefully slide the main board all the way in.

5.2.1 SAFETY PRECAUTION/PRODUCT ID LABEL

To look at the Rating/Product ID label on the case, you must follow the first step as described in **Section 5-2**. Refer to **Figure 5-2** for the location of the Product Identification label.

The meter is protected in accordance with Class I of EN61010. Refer to Safety Considerations page.

WARNING: If your meter is to be wired to sensors to control inputs that could be hazardous potentials, these potentials will be carried to the 20-pin output connector (P2) at the rear. They will also be present on the meter's circuit boards. Follow all instructions carefully BEFORE connecting the meter to any source of power.

DO NOT contact any exposed metal parts, install optional board(s), change jumpers, or in any way disassemble or assemble the meter while it is connected to AC voltage.

Note the following information and guidelines for safe operation of your meter.

POWER VOLTAGE

Your power source voltage rating should agree with the voltage under which the meter has been configured to operate. The first thing you should do is verify this.

The meter's operating voltage is shown in the VOLTS: entry of the Product Identification and Serial Number Label. It is located on the case, as shown in **Figure 5-2**, and is clearly visible on the meter packing box.

5.2.2 OPTIONAL BOARD(S) INSTALLATION

To install optional printed circuit board(s):

1. "Reveal the Main Board" (refer to **Section 5.2**, Disassembly).
2. Using **Figure 5-3** as a reference, insert option board(s) into the corresponding connector(s) on the main board. Each circuit board is keyed to fit in it's own position.

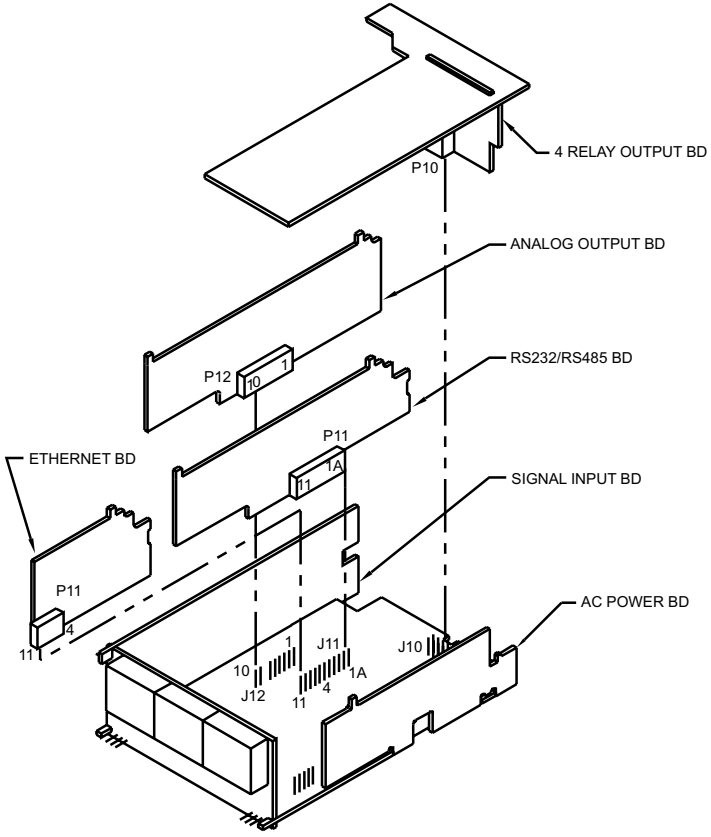


Figure 5-3. Optional Board Locations

5.2.3 HOW TO ACCESS JUMPERS

To gain access to jumper S1 and S2 used to configure input type remove the mounting sleeve. The jumpers may be accessed through the slot in the case.

To gain access to jumpers on the main board, for excitation and lockout selection:

1. "Reveal the main board" (refer to **Section 5.2**, Disassembly).

Note To access the S1 and S2 jumpers on the Signal Input Board, you only need to remove the mounting sleeve.

2. To re-assemble the meter, follow the steps in reverse order.

Figures 5-4 through **5-9** show the layout of the six (6) printed circuit boards with respective jumper blocks, where applicable, used in the meter.

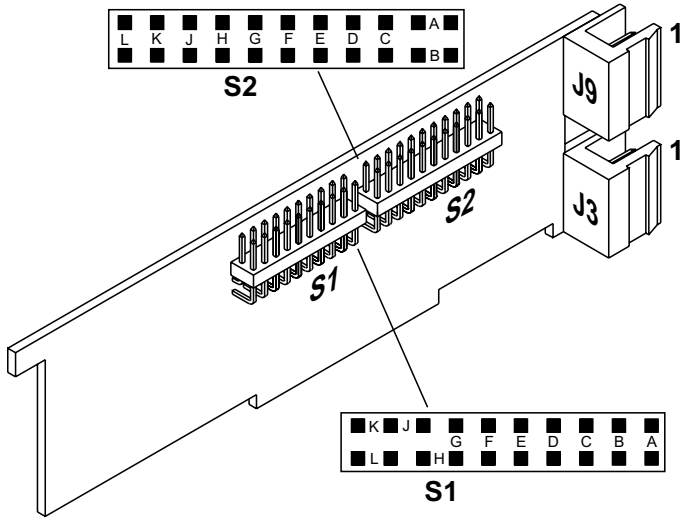


Figure 5-4. Signal Input Board

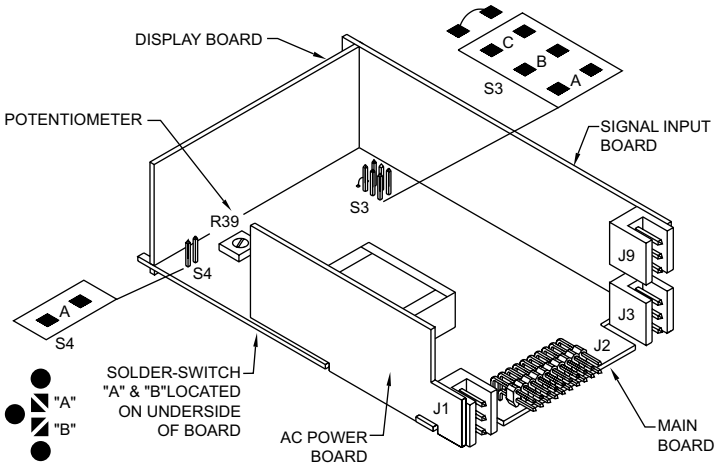
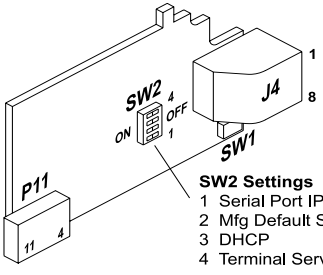


Figure 5-5. Main Board

S3A	Unlocks Pushbutton Programming
S3B (not installed)	Factory Calibration only, do not install.
S3C	Unlocks Lockout menus
S4A (installed) + solder-switch **B**	Selects 10 Vdc Sensor Excitation
S4A (not installed) + solder-switch **A**	Selects 24 Vdc Sensor Excitation

Table 5-1. Main Board Jumper Selections

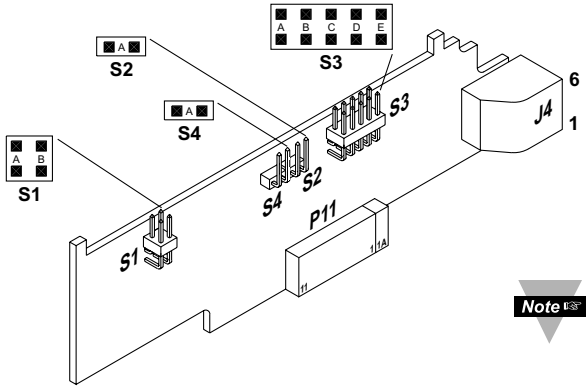


SW2 Settings
1 Serial Port IP Change
2 Mfg Default Settings
3 DHCP
4 Terminal Server

Note ☞ **Refer to your Ethernet Server Option Manual for more details.**

Default is “OFF” for all SW2 switches.

Figure 5-6. Ethernet Option Board



Note ☞ **Refer to your Serial Communications Option Manual for more details.**

Figure 5-7. RS-232/RS-485 Option Board

JUMPER	RS232	RS485 HALF DUPLEX	RS485 FULL DUPLEX
S1-A	CLOSE	OPEN	OPEN
S1-B	OPEN	CLOSE	OPEN
S2-A	OPEN	CLOSE	CLOSE
S3-A (CLOSE FOR TERMINAL RESISTOR)	OPEN	*	*
S3-B	OPEN	CLOSE	OPEN
S3-C (CLOSE FOR TERMINAL RESISTOR)	OPEN	*	*
S3-D	OPEN	CLOSE	OPEN
S3-E (CLOSE FOR RTS TRUE)	*	OPEN	OPEN
S4 (CLOSE FOR CONTINUOUS MODE)	OPEN	*	*

* = optional, select as required.

Table 5-2. RS-232/RS-485 Jumper Selections

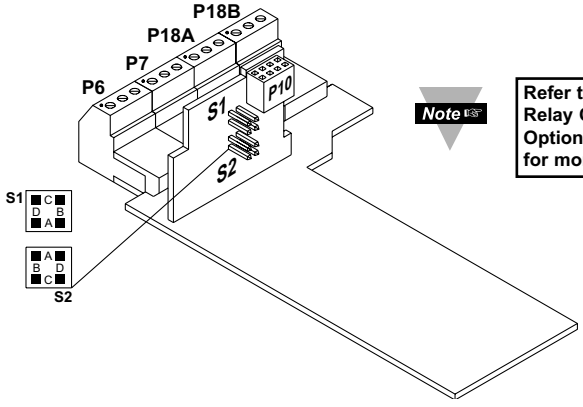


Figure 5-8. 4 Relay Output Option Board

The table below shows which jumpers are assigned to each relay. Defaults have asterisks.

Table 5-3 4 Relay Board Jumper Selction

S1	S2	FUNCTION
A, C*	A, C*	Assigns SP1 to Relay 1 (P6) Assigns SP2 to Relay 2 (P7) Assigns SP3 to Relay 3 (P18A) Assigns SP4 to Relay 4 (P18B)
B, D	A, C	Assigns SP1 to Relay 3 (P18A) Assigns SP2 to Relay 2 (P7) Assigns SP3 to Relay 1 (P6) Assigns SP4 to Relay 4 (P18B)
B, D	B, D	Assigns SP1 to Relay 3 (P18A) Assigns SP2 to Relay 4 (P18B) Assigns SP3 to Relay 1 (P6) Assigns SP4 to Relay 2 (P7)
A, C	B, D	Assigns SP1 to Relay 1 (P6) Assigns SP2 to Relay 4 (P18B) Assigns SP3 to Relay 3 (P18A) Assigns SP4 to Relay 2 (P7)

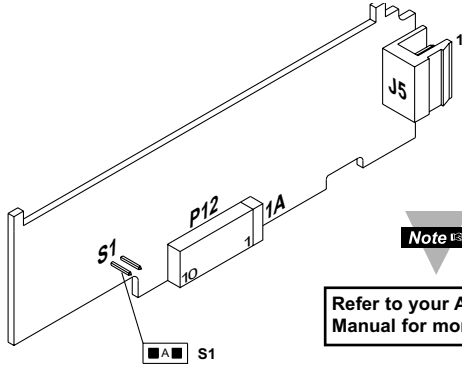


Figure 5-9. Analog Output Option Board

5.2.4 PANEL-MOUNT ASSEMBLY

The meter can be mounted in a panel so that the front of the meter is flush with the vertical panel surface. Panel mounting can be seen as simply “sandwiching” the panel between the inner case and the outer sleeve in the last phases of assembly. **Figure 5-10** shows the panel cutout dimensions, and the dimensions for the panel thickness. It requires that the following already be done:

1. Your line voltage rating has been checked against the meter rating on the Product ID and serial number label on the meter case. See **Section 5.2.1**.
2. You have configured all jumpers–those on the main board as well as those on any optional boards. See **Section 5.2.2** for main board jumper configuration and the appropriate sections for optional board jumper configuration.
3. You have installed all optional boards and inserted the main board assembly back into the case. See **Section 5.2.3**.
4. You have wired P1, the AC power connector, and P2 the input output control connector; connectors are not installed in the meter, but are ready to be installed. See **Section 7**.
5. You have wired all connectors for optional boards; connectors are not connected to the meter, but are ready to be installed.

If all of these steps are done, use **Figure 5-10** as a guide:

CAUTION: Connectors with the wiring connections will be installed after mounting the unit.

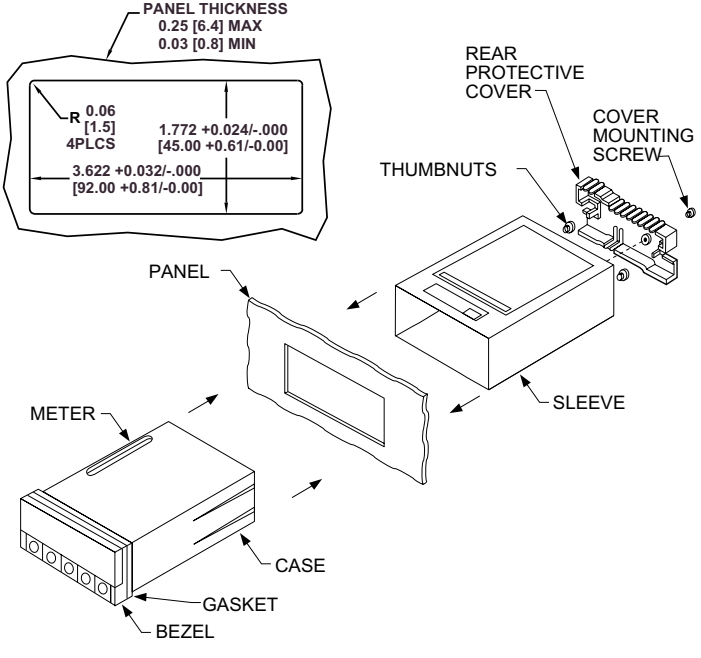


Figure 5-10. Panel Mounting Assembly

6. Punch or cut a hole in the panel using the panel cutout dimensions in **Figure 5-10**. Remove burrs and paint the panel as required.
7. Insert the panel-mount gasket around the rear of the case and slide it forward to the bezel (if it's not already in place).
8. Working from the front of the panel, insert the case assembly, rear end first, all the way into the panel cutout such that the gasket firmly backs the panel surface.
9. Working from the rear of the panel, slide the sleeve forward over the case and up to the panel surface.

The panel should now be sandwiched between the bezel-backed gasket in front and the sleeve in back.

10. Replace the thumbnuts that secure the sleeve tabs to the case.

WARNING: Do not “turn-on” the ac power and input signals until all connections are connected to the meter.

11. Set P1, the AC power connector, aside and connect or reconnect all other connectors to the back of the meter using **Figure 4-3** in **Section 4.2** as guides.

    Connect P1 last.

Note The P1 connector is “keyed”; it is shaped in such a way that it fits only the J1 male pins.

12. Replace the rear protective cover and secure it with the cover mounting screw.

Your meter is now ready for operation and you can turn-on the power.

WARNING: The unit becomes active as soon as it is connected to a power source. It has no On or Off switch. The unit at first momentarily shows the software (or Firmware) version number, during this time, user can switch to older Configuration Menu, **“MENU 2”** (the use of **MENU 2** is not covered in this manual, refer to “Menu 2 Manual” for proper instructions), followed by **“RESET 2”**, and then proceeds to the Run Mode.

6 Jumper Settings

This section is for the configuration and setup of your jumper positions for readrate, unipolar or bipolar signal input, sensor input signal jumpers, sensor excitation jumpers, pushbutton lockouts and lockout of lockout configuration menus.

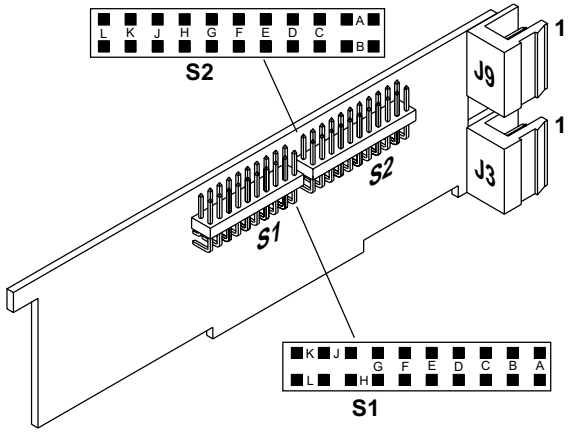
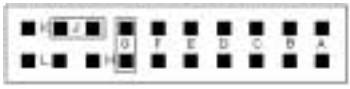


Figure 6-1. S1 and S2 Jumper Locations on Signal Input Board

6.1 THERMOCOUPLE Input:
S1_G/J; S2_A/B/K, jumpers are closed as shown:

S1



S2

6.2 RTD Input:

6.2.1 For RTDs:
S1_H; S2_A/B/F/J, jumpers are closed as shown:

S1

6.2.2 For RTD 10 ohm copper:
S1_H; S2_A/B/F/J/L, jumpers are closed as shown:

S1

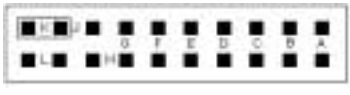
S2

6.3 VOLTAGE/PROCESS VALUE Input:

6.3.1 For ± 50mV, 0-100mV ranges:
S1_K; S2_A/B/G/H, jumpers are closed as shown:

NOTE: For some applications, the internal excitation is required; install jumpers G and H on S2 (as factory preset). If the external excitation is used, then remove jumper G only. These configurations are also applied to other Voltage/Process Input ranges.

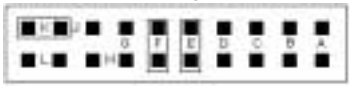
S1



S2

6.3.2 For ± 500mV, 0-1V ranges:
S1_K/E/F; S2_G/H, jumpers are closed as shown:

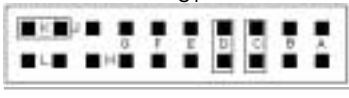
S1



S2

6.3.3 For ± 5V, 0-10V ranges:
S1_K/C/D; S2_G/H, jumpers are closed as shown:

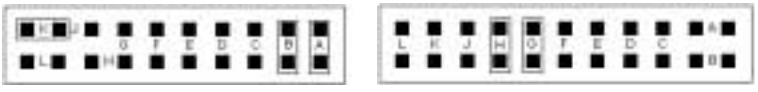
S1



S2

6.3.4 For ± 50V, 0-100V ranges:
S1_K/A/B; SD2_G/H, jumpers are closed as shown:

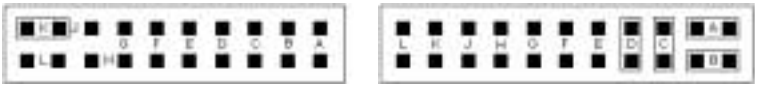
S1 S2



6.4 CURRENT/PROCESS VALUE Input:

6.4.1 For 0-20mA or 4-20mA range:
S1_K; S2_A/B/C/D, jumpers are closed as shown:

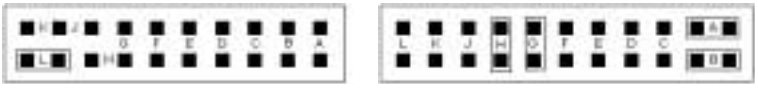
S1 S2



6.5 BRIDGE Input:

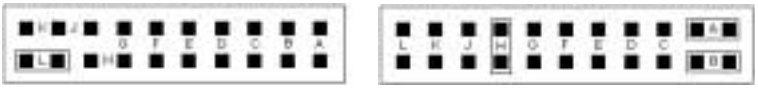
6.5.1 For ± 50mV, 0-100mV ranges with Internal Excitation**:**
S1_L; S2_A/B/G/H, jumpers are closed as shown:

S1 S2



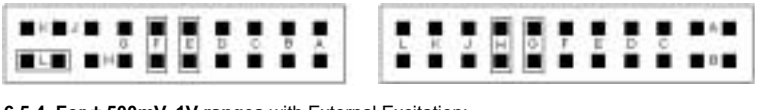
6.5.2 For ±50mV, 0-100mV ranges with External Excitation:
S1_L; S2_A/B/H, jumpers are closed as shown:

S1 S2



6.5.3 For ± 500mV, 1V ranges with Internal Excitation**:**
S1_L/E/F; S2_G/H, jumpers are closed as shown:

S1 S2



6.5.4 For ± 500mV, 1V ranges with External Excitation:
S1_L/E/F; S2_H, jumpers are closed as shown:

S1 S2

6.5.5 For ± 5V, 0-10V ranges with Internal Excitation**:**
S1_L/C/D; S2_G/H, jumpers are closed as shown:

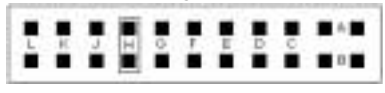
S1

S2

6.5.6 For ± 5V, 0-10V ranges with External Excitation**:**
S1_L/C/D; S2_H, jumpers are closed as shown:

S1

S2



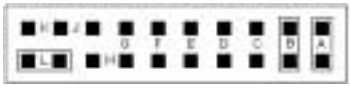
6.5.7 For ± 50V, 0-100V ranges with Internal Excitation:
S1_L/A/B; S2_G/H, jumpers are closed as shown:

S1

S2

6.5.8 For ± 50V, 0-100V ranges with External Excitation:
S1_L/A/B; S2_H, jumpers are closed as shown:

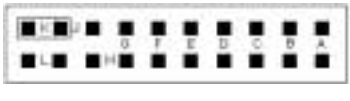
S1



S2

6.5.9 For 0-20mA or 4-20mA range with Internal Excitation:
S1_K; S2_A/B/C/D/G/H, jumpers are closed as shown with Internal Excitation:

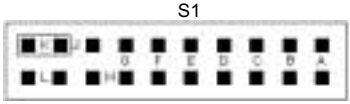
S1



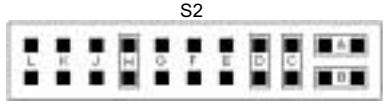
S2

6.5.10 For 0-20mA or 4-20mA range with External Excitation:
S1_K; S2_A/B/C/D/H, jumpers are closed as shown with External Excitation:

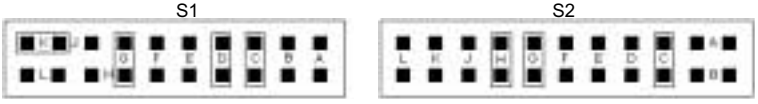
S1



S2



6.5.11 POTENTIOMETER Input:
S1_K/G/C/D; S2_C/G/H jumpers are closed as shown:



Jumper	Function
S4A (installed) + solder jumper B	Selects 10 Vdc Sensor Excitation
S4A (not installed) + solder jumper A	Selects 24 Vdc Sensor Excitation

Table 6-1. Sensor Excitation Main Board Jumper Selection

Note ☞ Refer to **Figure 5-5** for solder jumper locations.

7.1 INTRODUCTION

The following describes how to connect your sensors to your meter with and without sensor excitation and how to connect the AC power to your meter. Prior to wiring the sensor to the meter, check with a multimeter that a proper excitation exists.

WARNING: Do not connect ac power to your meter until you have completed all input and output connections. Failure to do so may result in injury! This device must only be installed electrically by specially trained electrician with corresponding qualifications.

Note ☞ Earth ground MUST be connected to the same earth ground used by the signal source, in order to achieve published stability and accuracy specifications.

7.2 SIGNAL INPUT CONNECTIONS - PROCESS

The following **Figures** (**7-1** through **7-5**) show the connections for voltage, current and potentiometer inputs:

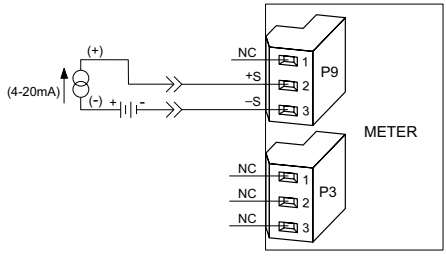


Figure 7-1. Current Input Without Sensor Excitation

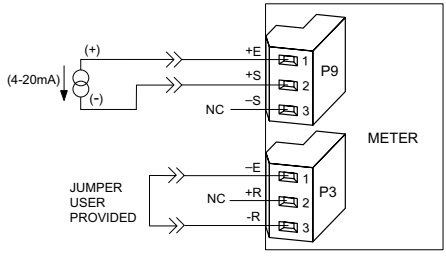


Figure 7-2. Current Input With Sensor Excitation

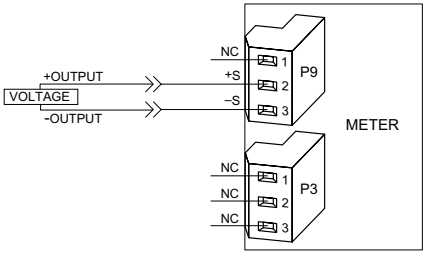
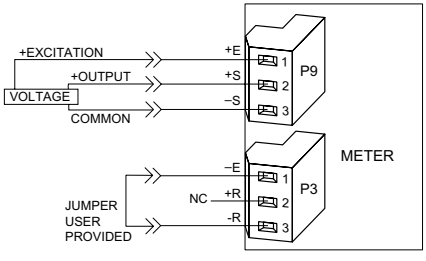
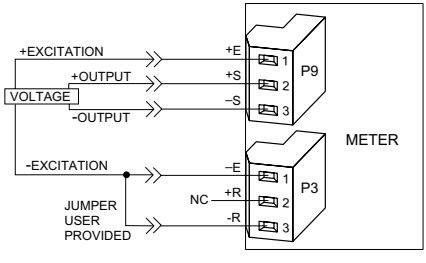


Figure 7-3. Voltage Input Without Sensor Excitation



Jumper
S2-C
Closed

Figure 7-4. 3-Wire Voltage Input With Sensor Excitation



Jumper
S2-C
Closed

Figure 7-5. 4-Wire Voltage Input With Sensor Excitation

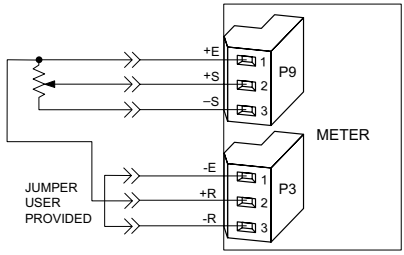


Figure 7-6. Potentiometer Connections with Internal Power Supply and Ratio Measurement.

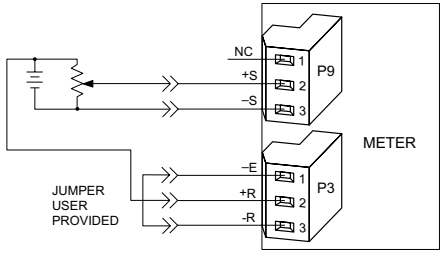


Figure 7-7. Potentiometer Connections with External Power Supply and Ratio Measurement (Remove Jumper S2-G)

7.3 SIGNAL INPUT CONNECTIONS - TEMPERATURE

The following **Figures (7-8 through 7-11)** show the connections for Thermocouple and RTD Inputs.

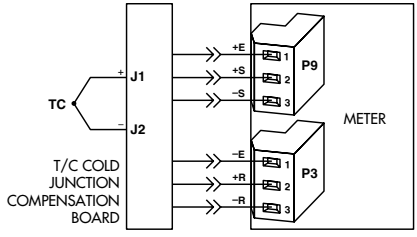


Figure 7-8. Directly-Connected Thermocouple

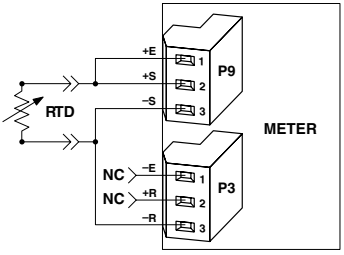


Figure 7-9. RTD Connections with 2-wire RTD

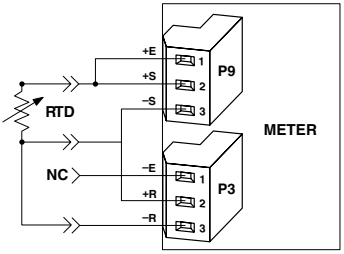


Figure 7-10. RTD Connections with 3-wire RTD

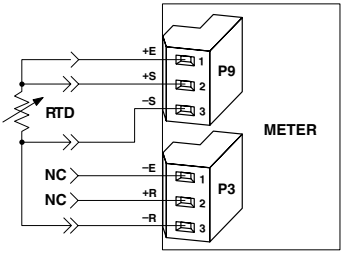


Figure 7-11. RTD Connections with 4-wire RTD

7.4 SIGNAL INPUT CONNECTIONS - STRAIN

The following **Figures (7-12 through 7-19)** show the connections for voltage, current and potentiometer inputs:

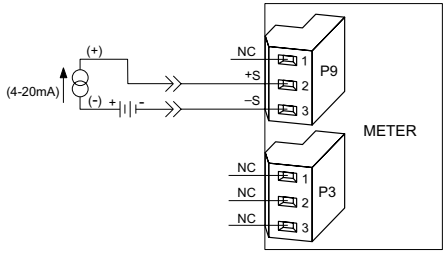


Figure 7-12. Current Input Without Sensor Excitation

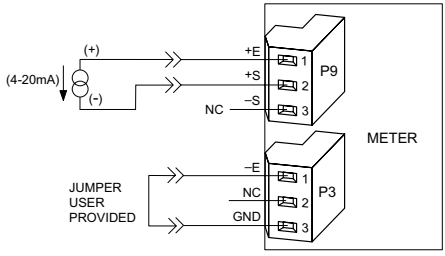


Figure 7-13. Current Input With Sensor Excitation

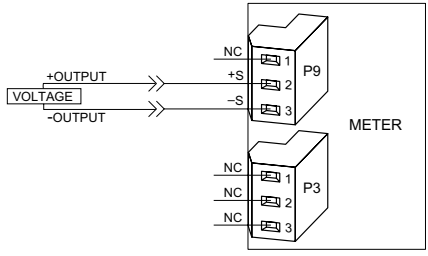


Figure 7-14. Voltage Input Without Sensor Excitation

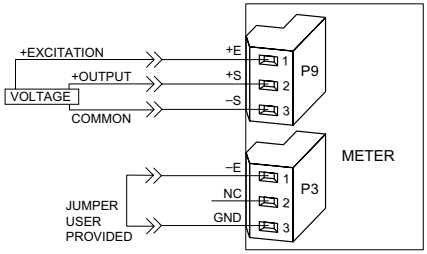


Figure 7-15. 3-Wire Voltage Input With Sensor Excitation

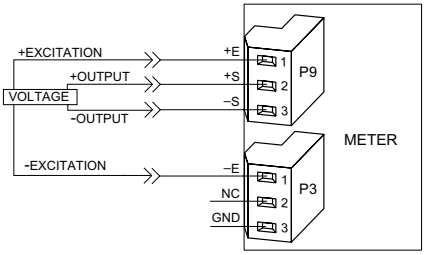


Figure 7-16. 4-Wire Voltage/Bridge Input With Sensor Excitation

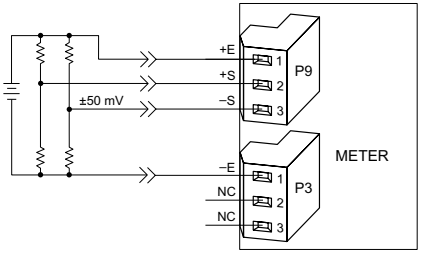


Figure 7-17. Bridge Input With External Sensor Excitation

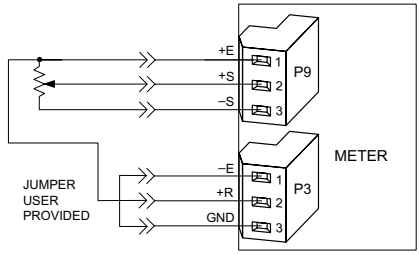


Figure 7-18. Potentiometer Connections with Internal Power Supply and Ratio Measurement

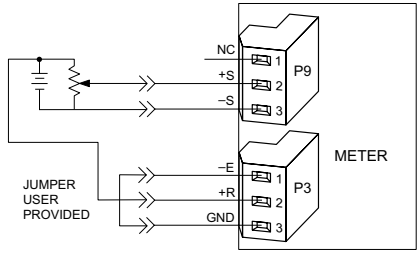


Figure 7-19. Potentiometer Connections with External Power Supply and Ratio Measurement (Remove jumper S2-G)

7.5 COLD JUNCTION COMPENSATION BOARD INSTALLATION FOR THERMOCOUPLES

To setup the rear protective cover with the P3 and P9 connectors (and Cold-Junction Compensation Board), proceed with the following (Refer to **Figure 7-20**).

1) Obtain P3 and P9 connectors and the thermocouple rear protective cover.

2) Put the two (2) connectors P3 and P9 into the corresponding male connectors at the rear of the meter. Refer to **Figure 4-3** for the location of the male connectors. P3 and P9 are identical and interchangeable connectors.

3) Using a long slotted screwdriver (one that is at least 4" long), loosen the 6 screws on the connectors.

4) Carefully install the thermocouple rear protective cover onto the connectors making sure the pins in the rear cover make good contact with the holes in the connectors.

5) Tighten the 6 screws (do not over-tighten).

6) Fasten down the cover with the cover mounting screw.

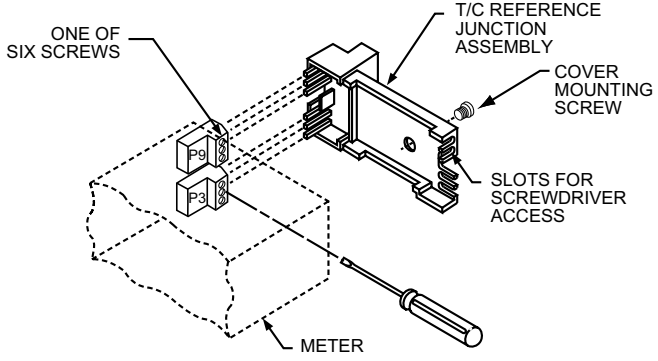


Figure 7-20. Installation of Thermocouple Cold-Junction Compensation Board Assembly

7.5.1 COLD JUNCTION COMPENSATION BOARD WIRING

Figure 7-21 shows the wiring hookup for thermocouples. Use the following table to determine which colored wired get connected to the positive and negative terminals.

Note: Positive (+) and Negative (-) wiring designations are molded into the plastic cover.

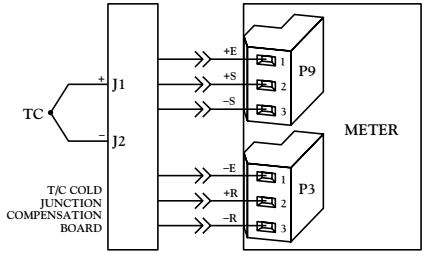


Figure 7-21. Directly-Connected Thermocouple

7.5.2 THERMOCOUPLE WIRE COLORS

Table 7-1. Thermocouple Wire Colors

USA		
T/C TYPE	WIRE COLORS + LEAD	– LEAD
J	White	Red
K	Yellow	Red
T	Blue	Red
E	Purple	Red
N	Orange	Red
R	Black	Red
S	Black	Red
B	Gray	Red
DIN J	Red	Blue

	FRANCE		GERMANY	
T/C TYPE	WIRE COLORS + LEAD	– LEAD	WIRE COLORS + LEAD	– LEAD
J	Yellow	Black	Red	Blue
K	Yellow	Purple	Red	Green
T	Yellow	Blue	Red	Brown
E	Yellow	Purple	Red	Black
N	No Standard-See USA		No Standard-See USA	
R	Yellow	Green	Red	White
S	Yellow	Green	Red	White
B	Use Copper Wire		Red	Gray
DIN J	Red	Blue	Red	Blue

	JAPAN		UNITED KINGDOM	
T/C TYPE	WIRE COLORS + LEAD	– LEAD	WIRE COLORS + LEAD	– LEAD
J	Red	White	Yellow	Blue
K	Red	White	Brown	Blue
T	Red	White	White	Blue
E	Red	White	Brown	Blue
N	No Standard-See USA		No Standard-See USA	
R	Red	White	White	Blue
S	Red	White	White	Blue
B	Red	Gray	No Standard-See USA	
DIN J	Red	Blue	Red	Blue

7.6 AC WIRING CONNECTION

Wire your power (from a wall socket or other source) to P1, the orange, 3-socket connector that plugs into the 3 pins on the left side as you view the meter from the rear. The orange (power) connector must be wired according to the following table (also refer to **Figure 7-8**):

USA WIRING CODE	EUROPE WIRING CODE	CONNECTION	PIN # ON ORANGE CONNECTOR
Black	Brown	~ AC Line (L)	1
White	Blue	~ AC Neutral (N)	2
Green	Green/Yellow	~ AC Protective Ground ⏚	3

Note Earth ground MUST be connected to the same earth ground used by the signal source, in order to achieve published stability and accuracy specifications.

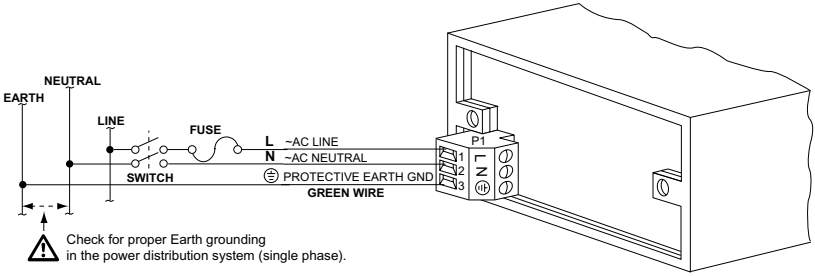


Figure 7-22. AC Connector Wiring at P1

Connect your AC meter power as described above and as shown in **Figure 7-8**:

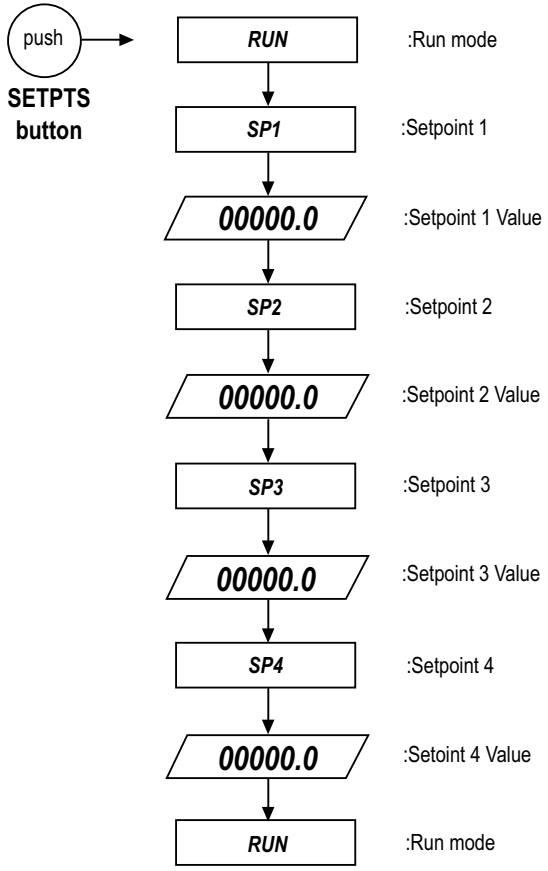
CAUTION: As mentioned in **Section 3.1**, the meter has no power ON/OFF switch. The meter will be ON when power is applied.

WARNING: Do not connect ac power to your meter until you have completed all input and output connections. Failure to do so may result in injury! This device must only be installed electrically by specially trained electrician with corresponding qualifications. The main power input to the unit as well as the AC input signal to be measured must agree with the wiring instruction. The meter is factory set to the power specified by the customer at the time of ordering. The voltage is printed on the Product ID Label.

You are now ready to proceed with setting setpoints as described in **Section 8**.

8 Setpoint Settings Menu Flowchart

8 SETPOINT SETTINGS MENU FLOWCHART



Note Once this **'SETPTS'** button is pressed, each of the four setpoints' value will be displayed for approximately 10 sec. in the sequence of this Setpoint Setting Menu Flowchart, unless the **'SETPTS'** is repeatedly pushed or setpoint is being edited.

9 ACTIVE BUTTONS: 'SETPTS', '▲/MAX', '►/MIN'.

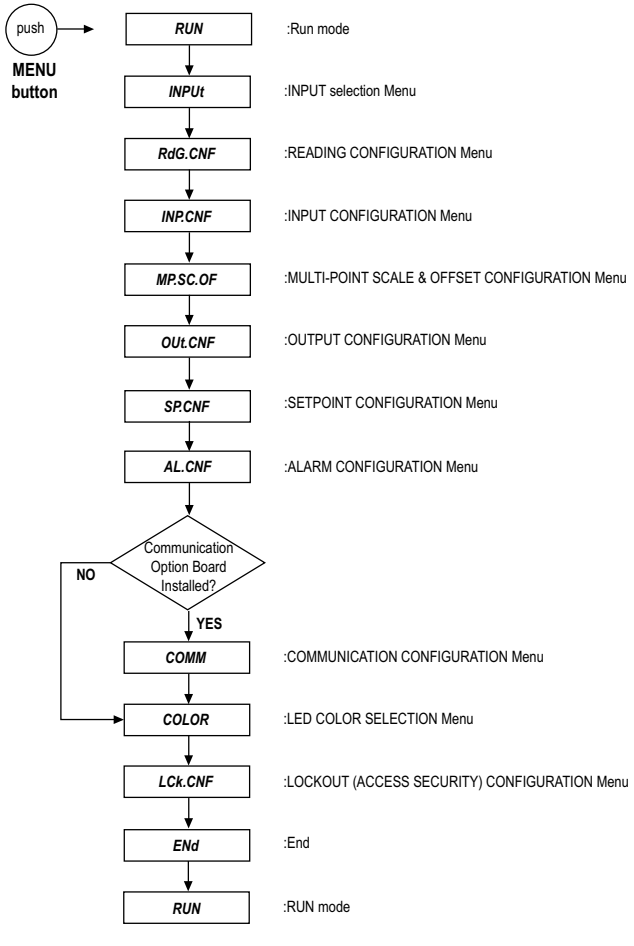
Press '**SETPTS**'	1) The display shows ***"SP1"*** momentarily then ***"00000.0"*** or previous setpoint value with first digit flashing. If any digit or value is not flashing that setpoint value's modification, the '**MAX**' and '**MIN**' buttons are disabled or locked. (Refer to **LCk.CNF** Menu Configuration to unlock the setpoint for regaining access of those buttons).
Press '**▲/MAX**'	2) If it is necessary to modify a setpoint other than SP1, the display will automatically show each of the next setpoints in about 10 seconds; then select the desired one by '**MAX**' button. Otherwise the instrument will return to RUN mode after SP 4's value displayed.
Press '**SETPTS**'	3) To scroll through available setpoints and return to RUN mode in the following sequence: ***"SP 1"***, "Setpoint1's value" ***"SP 2"***, "SP2's value" ***"SP 3"***, "SP3's value" ***"SP 4"***, "SP4's value" ***"RUN"***.
Press '**▲/MAX**'	4) Enables the user to select and modify first, or flashing digit of the setpoint value.
Press '**▲/MAX**'	5) The digit will change in this following cycle: 0 to 9, - (minus sign).
Press '**▲/MIN**'	6) To select the next downward digit to modify.
Press '**SETPTS**' new	7) Display shows ***"StOREd"*** stored message momentarily (to save the value if a change was made) then advances to next item ***"SP2"*** Setpoint 2.
Press '**SETPTS**'	8) Continue pressing '**SETPTS**' to access next setpoint and return to RUN Mode.

Note

The display Menu will advance to the next setpoints menu item about 10 seconds at any step within this menu and the new value of setpoint will be stored automatically if a change was made.

For more Setpoint Configuration and applications, refer to **Section 21**.

10 MAIN MENU CONFIGURATION FLOWCHART

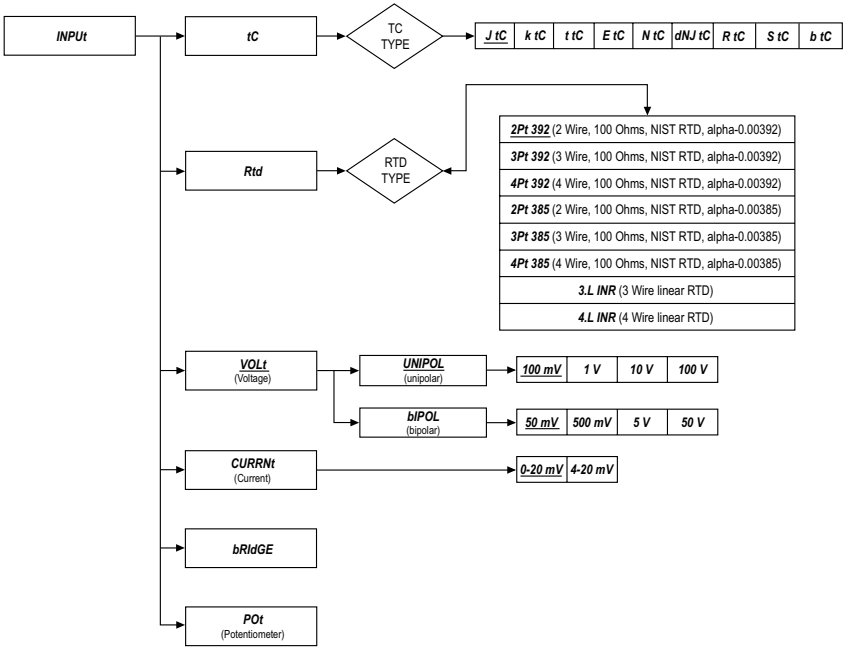


Note

1) Once lockout security ID code is set “enable”, the Menu will not be displayed through Main Configuration Menu navigation.

2) To regain access to the locked Menu, user will be prompted for security ID code at LCk.CNF Menu.

11 INPUT TYPE MENU FLOWCHART: (INPUt)



12 Input Type Selection

12 INPUT TYPE SELECTION: (INPUt)

12.1 INPUT TYPE: (THERMOCOUPLE)

INPUt	**ENTER INPUT TYPE MENU:**
Press '**MENU**'	1) Display shows ***"INPUt"*** Input Menu.
Press '**RESET/ENTER**'	2) Display flashes ***"VOLt"*** or previous stored input type.
Press '**▲/MAX**'	3) Scroll through the available following input type selection list. Display flashes: ***"VOLt"*** (DC Voltage) ***"CURRNt"*** (DC Current) ***"bRIdGE"*** (Bridge) ***"POt"*** (Potentiometer) ***"tC"*** (Thermocouple) ***"Rtd"*** (RTD). If the displayed input type is ***"tC"***, press '**RESET/ENTER**' to skip to Step 6 (***"tC"*** stops flashing).
t.C	***"t.C"*** **THERMOCOUPLE SUBMENU:**
Press '**▲/MAX**'	4) Scroll through the available selection to ***"tC"*** (flashing).
Press '**RESET/ENTER**'	5) Display shows ***"tC"*** again, but not flashing.
Press '**RESET/ENTER**'	6) Display flashes previous thermocouple type selection. ie. ***"J tC"*** as default, (see Table below for types). If the display matches your choice of Thermocouple. Go to Step 8.
Press '**▲/MAX**'	7) Scroll through the available thermocouple types to the selection of your choice.
Press '**RESET/ENTER**'	8) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"RdG.CNF"*** Reading Configuration Menu.

Thermocouple Types:	**J**	**K**	**T**	**E**	**N**	**DIN J**	**R**	**S**	**B**
Display:	**J tC**	**k tC**	**t tC**	**E tC**	**N tC**	**dNJ tC**	**R tC**	**S tC**	**b tC**

12.2 INPUT TYPE: (RTD)

	ENTER INPUT TYPE MENU:
Press '**MENU**'	1) Display shows ***"INPUt"*** Input Menu.
Press '**RESET/ENTER**'	2) Display flashes ***"VOLt"*** (default) or previous stored input type.
Press '**▲/MAX**'	3) Scroll through the available following input type selection list. Display flashes: ***"VOLt"*** (DC Voltage) ***"CURRNt"*** (DC Current) ***"bRIdGE"*** (Bridge) ***"POt"*** (Potentiometer) ***"tC"*** (Thermocouple) ***"Rtd"*** (RTD) If the displayed input type is ***"Rtd"***, press '**RESET/ENTER**' to skip to Step 6 (***"Rtd"*** stops flashing).
Rtd	***"Rtd"* RTD SUBMENU:**
Press '**▲/MAX**'	4) Scroll through the available selection to ***"Rtd"*** (flashing).
Press '**RESET/ENTER**'	5) Display shows ***"StOREd"*** stored message momentarily and then ***"Rtd"*** (not flashing).
Press '**RESET/ENTER**'	6) Display flashes previous RTD type selection. ie. ***"2Pt 392"*** default (see Table below for types). If the display matches your choice of RTD type. Go to Step 8
Press '**▲/MAX**'	7) Scroll through the available RTD types to the selection of our choice.
Press '**RESET/ENTER**'	8) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"RdG.CNF"*** Reading Configuration Menu.

Display	RTD types
2Pt 392	2 wire, 100 Ohms, NIST RTD, alpha=0.00392
3Pt 392	3 wire, 100 Ohms, NIST RTD, alpha=0.00392
4Pt 392	4 wire, 100 Ohms, NIST RTD, alpha=0.00392
2Pt 385	2 wire, 100 Ohms, NIST RTD, alpha=0.00385
3Pt 385	3 wire, 100 Ohms, NIST RTD, alpha=0.00385
4Pt 385	4 wire, 100 Ohms, NIST RTD, alpha=0.00385
3.L INR	3 wire, linear RTD
4.L INR	4 wire, linear RTD

12.3 INPUT TYPE: (DC VOLTAGE/PROCESS VALUE)

ENTER INPUT TYPE MENU:

Press '**MENU**' — 1) Display shows ***"INPUt"*** Input Menu.

Press '**RESET/ENTER**' — 2) Display flashes ***"VOLt"*** (default) or previous stored input type.

Press '**▲/MAX**' — 3) Scroll through the available following input type selection list. Display flashes:

"VOLt" (DC Voltage)
"CURRNt" (DC Current)
"bRIdGE" (Bridge)
"POt" (Potentiometer)
"tC" (Thermocouple)
"Rtd" (RTD)

If the displayed input type is ***"VOLt"***, press '**RESET/ENTER**' to skip to Step 6 (***"VOLt"*** stops flashing).

VOLt — ***"VOLt"*** **DC VOLTAGE SUBMENU:**

Press '**▲/MAX**' — 4) Scroll through the available selection to ***"VOLt"*** (flashing).

Press '**RESET/ENTER**' — 5) Display shows ***"VOLt"*** again, but not flashing.

Press '**RESET/ENTER**' — 6) Display flashes ***"UN IPOL"*** unipolar (default) or previously stored selection of voltage input type ***"bI POL"*** bipolar.

Note ☞ You must choose bi-Polar or uni-Polar before selecting Bridge or Potentiometer

Press '**▲/MAX**' — 7) Scroll through the 2 available voltage input types to the selection of your choice.

Press '**RESET/ENTER**' — 8) Display flashes ***"100 MV"***(default) or previous stored input voltage range selection. If the display matches your choice of Voltage range. Go to Step 10.

Press '**▲/MAX**' — 9) Scroll through the available voltage ranges to the selection of your choice (see below Table for Voltage Input types/Ranges selection).

Press '**RESET/ENTER**' — 10) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"RdG.CNF"*** Reading Configuration Menu.

Display	Voltage types	Voltage Ranges
UN IPOL		
100 MV	unipolar	100 milliVolt DC
1 V	unipolar	1 Volt DC
10 V	unipolar	10 Volt DC
100 V	unipolar	100 Volt DC
bI POL		
50 MV	bipolar	± 50 milliVolt DC
500 MV	bipolar	± 500 milliVolt DC
5 V	bipolar	± 5 Volt DC
50 V	bipolar	± 50 Volt DC

12.4 INPUT TYPE: (DC CURRENT)

	ENTER INPUT TYPE MENU:
Press '**MENU**'	1) Display shows ***"INPUt"*** Input Menu.
Press '**RESET/ENTER**'	2) Display flashes ***"VOLt"*** (default) or previous stored input type.
Press '**▲/MAX**'	3) Scroll through the available following input type selection list. Display flashes: ***"VOLt"*** (DC Voltage) ***"CURRNt"*** (DC Current) ***"bRIdGE"*** (Bridge) ***"POt"*** (Potentiometer) ***"tC"*** (Thermocouple) ***"Rtd"*** (RTD) If the displayed input type is ***"CURRNt"***, press '**RESET/ENTER**' to skip to Step 6 ("***CURRNt"*** stops flashing).

CURRNt	***"CURRNt"* CURRENT SUBMENU:**
Press '**▲/MAX**'	4) Scroll through the available selection to ***"CURRNt"*** (flashing).
Press '**RESET/ENTER**'	5) Display shows ***"CURRNt"*** again, but not flashing.
Press '**RESET/ENTER**'	6) Display flashes ***"0-20MA"*** current range (default) or previously stored selection of current input range (see Table below for available current ranges). If the display matches your choice of current range. Go to Step 8.
Press '**▲/MAX**'	7) Scroll through the 2 available current input ranges to the selection of your choice.
Press '**RESET/ENTER**'	8) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"RdG.CNF"*** Reading Configuration Menu.

CURRENT RANGES:	0 – 20 milliampere	4 – 20 milliampere
DISPLAY:	***0-20MA***	***4-20MA***

12.5 INPUT TYPE: (BRIDGE)

	ENTER INPUT TYPE MENU:
Press '**MENU**'	1) Display shows ***"INPUt"*** Input Menu.
Press '**RESET/ENTER**'	2) Display flashes ***"VOLt"*** (default) or previous stored input type.
Press '**▲/MAX**'	3) Scroll through the available following input type selection list. Display flashes: ***"VOLt"*** (DC Voltage) ***"CURRNt"*** (DC Current) ***"bRIdGE"*** (Bridge) ***"POt"*** (Potentiometer) ***"tC"*** (Thermocouple) ***"Rtd"*** (RTD) If the displayed input type is ***"bRIdGE"***, press '**RESET/ENTER**' to skip to Step 6 (***"bRIdGE"*** stops flashing).

bRIdGE	***"bRIdGE"* SUBMENU:**
Press '**▲/MAX**'	4) Scroll through the available selection to ***"bRIdGE"*** (flashing).
Press '**RESET/ENTER**'	5) Display shows ***"bRIdGE"*** again, but not flashing.
Press '**RESET/ENTER**'	6) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"RdG.CNF"*** Reading Configuration Menu.

Note ☞

To ensure the input range is properly polarized as desired for configuration, the user must select ***"UN IPOL"*** input (default) or ***"bI POL"*** bipolar accordingly in the input ***VOLt*** DC VOLTAGE SUBMENU with the same voltage range **before** selecting ***"BRIdGE"*** or ***"POt"*** Potentiometer input type.

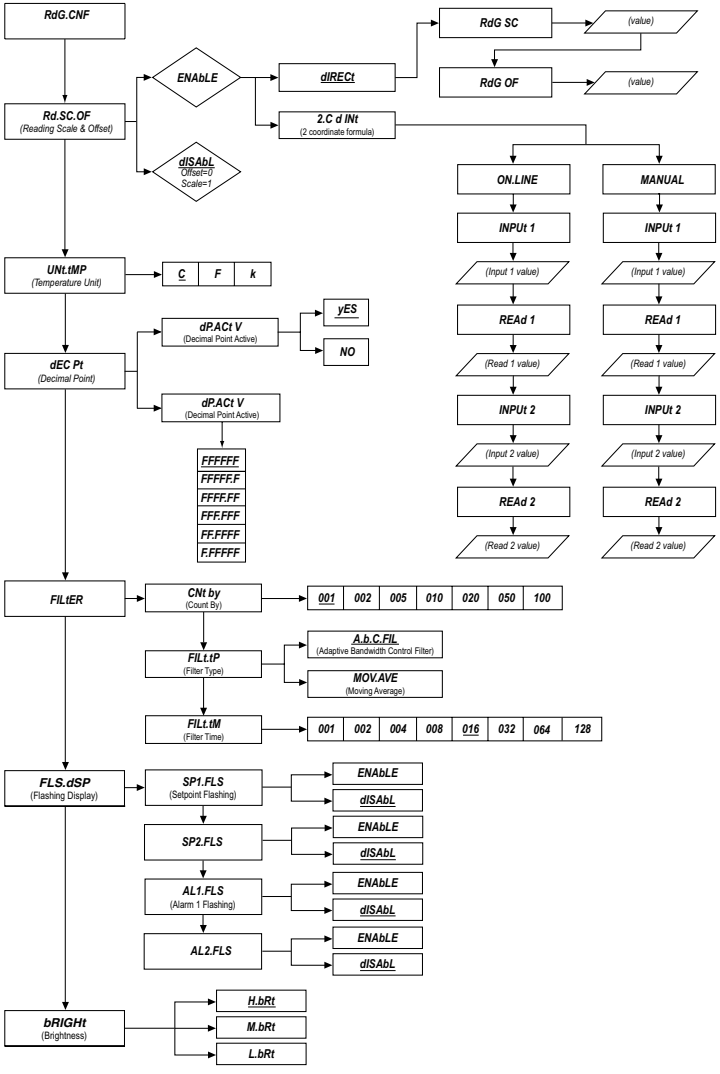
12.6 INPUT TYPE: (POTENTIOMETER)

	ENTER INPUT TYPE MENU:
Press '**MENU**'	1) Display shows ***"INPUt"*** Input Menu.
Press '**RESET/ENTER**'	2) Display flashes ***"VOLt"*** (default) or previous stored input type.
Press '**▲/MAX**'	3) Scroll through the available following input type selection list. Display: ***"VOLt"*** (DC Voltage) ***"CURRNt"*** (DC Current) ***"bRIdGE"*** (Bridge) ***"POt"*** (Potentiometer) ***"tC"*** (Thermocouple) ***"Rtd"*** (RTD) If the displayed input type is ***"POt"***, press '**RESET/ENTER**' to skip to Step 6 (***"POt"*** stops flashing).
POt	***"POt"*** **POTENTIOMETER SUBMENU:**
Press '**▲/MAX**'	4) Scroll through the available selection to ***"POt"*** (flashing).
Press '**RESET/ENTER**'	5) Display shows ***"POt"*** again, but not flashing.
Press '**RESET/ENTER**'	8) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"RdG.CNF"*** Reading Configuration Menu.

Note ☞

To ensure the input range is properly polarized as desired for configuration, the user must select ***"UN IPOL"*** input (default) or ***"bI POL"*** bipolar accordingly in the input ***VOLt*** DC VOLTAGE SUBMENU with the same voltage range **before** selecting ***"BRIdGE"*** or ***"POt"*** Potentiometer input type.

13 READING CONFIGURATION MENU and FLOWCHART: (RdG.CNF)



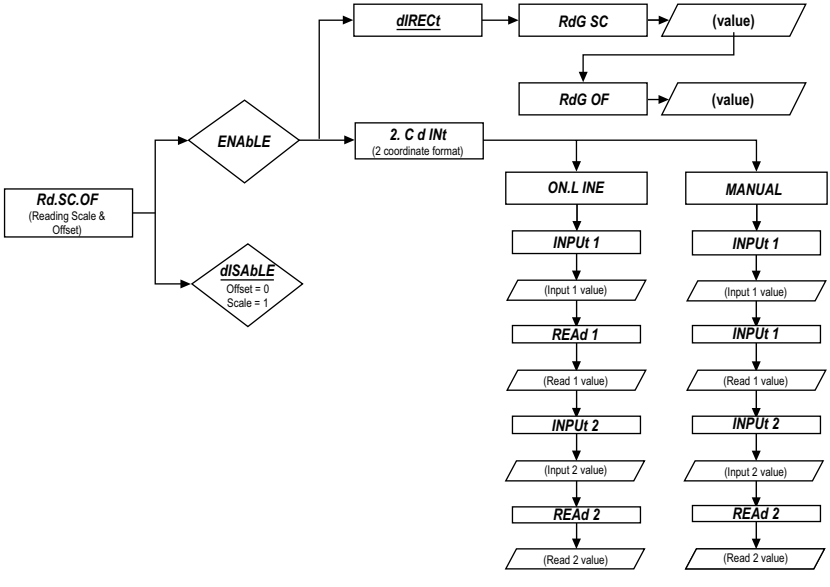
14 READING CONFIGURATION MENU:

RdG.CNF **ENTER READING CONFIGURATION MENU:**

Press '**MENU**' 1) Twice though Main Menu items and display shows ***"RdG.CNF "***.
Press '**RESET/ENTER**' 2) Display shows ***"Rd.SC.OF "*** Reading Scale & Offset menu.
Press '**MENU**' 3) Scroll through the following sequence of available Reading Configuration Menu selection list:

"Rd.SC.OF" (Reading Scale & Offset)
"Unt.tMP" (Temperature Unit)
"dEC Pt" (Decimal Point)
"FILtER" (Reading Filters)
"FLS.dSP" (Flashing Display)
"bRIGHt" (Display Brightness Option).

14.1 Rd.SC.OF **ENTER READING SCALE & OFFSET SUBMENU:**



14 Reading Configuration Menu

Press '**RESET/ENTER**' 4) To enter Reading Scale & Offset configuration Submenu if display shows ***"Rd.SC.OF"*** (First Item of ***"RdG.CNF"*** Menu).

Press '**RESET/ENTER**' 5) Display shows and flashes ***"dISAbL"*** disable (as default, Reading Scale=1.0 and Reading Offset=0.0).

Press '**▲/MAX**' 6) Display flashes either ***"ENAbLE"*** or ***"dISAbL"***. Select your choice and press '**RESET/ENTER**'. If ***"dISAbL"*** selected, display advances to ***"UNt.tMP"*** Temperature Unit selection Submenu.

Note

* If you select ENABLE, the following Steps 7 through 32 describe Reading Scale & Offset Format Submenu. Otherwise continue with ***"UNt.tMP"*** in next section.
* For more detail, example, formula and Calculation Table, Refer to **Section 18** of **MULTI-POINT SCALE & OFFSET MENU CONFIGURATION**.

Enter READING SCALE & OFFSET FORMAT SUBMENU:

Press '**RESET/ENTER**' 7) To enter Reading Scale & Offset Format Configuration Submenu. Display shows ***"StOREd"*** stored message momentarily then flashes ***"dIRECt"*** (default) Direct format or previous format selection, if your option of ***"Rd.SC.OF"*** or previously setup was ***"ENAbLE"***.

Press '**▲/MAX**' 8) Scroll between two available formats: ***"dIRECt"*** or ***"2.Cd INt"*** (2-coordinate format) for the configuration format of your choice. If your choice of selection is ***"2.Cd INt"***, skip to Step 17).

dIRECt **READING SCALE & OFFSET DIRECT FORMAT MENU:**

Direct scale and Offset: these two values are used in the straight line equation, y = mx + b. (***"Rd.SC.OF"***):
Display Reading = m times input plus b
or Display Reading = [m (input) + b]
(Where m is the ***"RdG SC"*** and b is the ***"RdG OF"***).

Press '**RESET/ENTER**' 9) Display still shows ***"dIRECt"*** and stops flashing.

Press '**RESET/ENTER**' 10) Display shows ***"RdG SC"*** Reading Scale.

Press '**RESET/ENTER**' 11) Display shows Direct Reading Scale Value (1.00000 as default or previous setup value) with first digit flashing.

Press '**▲/MAX**' & ' **▶/MIN**' 12) Use '**MAX**' and '**MIN**' buttons to enter new value of ***"RdG SC"*** Direct Reading Scale.

Press '**RESET/ENTER**' 13) Display advances to ***"RdG OF"*** Direct Reading Offset. If a change was made, the controller will also show ***"StOREd"*** stored message momentarily.

Press '**RESET/ENTER**' 14) Display shows Direct Reading Offset Value (-000.00 as default or previous setup value) with first digit flashing.

Press '**▲/MAX**' & ' **▶/MIN**' 15) Use '**MAX**' and '**MIN**' buttons to enter new value of ***"RdG OF"*** Direct Reading Offset.

Press '**RESET/ENTER**' 16) Display advances to ***"UNt.tMP"*** Temperature Unit Selection Menu. If a change was made, the controller will also show ***"StOREd"*** stored message momentarily.

2.Cd In **READING SCALE & OFFSET 2-COORDINATE FORMAT MENU:**

Input voltage or current can be converted or scaled into values appropriate for the process or signal being measured. A reading may be displayed, for example, in units of weight or velocity instead of in amperes and volts. The controller determines scale and offset values based on two user-provided input values entered with the corresponding readings.

There are two methods to scale this meter to display readings in engineering units.

- The first method ***"ON.L INE"*** is to scale with known loads. Do this by applying known loads to a transducer connected to a meter, or by simulating the output of the transducer with voltage or current simulator.
- The second method ***"MANUAL"*** is to scale without known inputs. Do this by calculating input values based on transducer specifications and manually entering them through the keyboard.

Press '**RESET/ENTER**' 17) Display shows ***"2.Cd INt"*** (2-coordinate format) and stops flashing if display was prompted ***"2.Cd INt"***.

If this scaling method is selected, calculate the input values to the instrument based on the actual signal being received.

ON.L INE

Press '**RESET/ENTER**' 18) Display flashes ***"ON.L INE"*** On line method.
Press '▲**/MAX**' 19) Scroll between 2 available selections: ***"ON.L INE"*** or ***"MANUAL"*** for the configuration option of your choice. If your choice of selection is ***"MANUAL"***, skip to Step 28).
Press '**RESET/ENTER**' 20) Display stops flashing and shows ***"ON.L INE"***.
Press '**RESET/ENTER**' 21) Display shows ***"INPUt 0"*** Item #1 of coordinate #1. Pressing '**RESET/ENTER**' to sequence through:

"INPUt 0", Input 0 's value
"REAd 0", Read 0 's value
"INPUt 1", Input 1 's value
"REAd 1", Read 1 's value

headings for the desired selection to enter new value.

Press '**RESET/ENTER**'	22) Display shows ***"xxxxxx"*** some 6-digit number, represents the value of ***"INPUt 0"*** as taken from live input source measurement for desired value.
Press '**RESET/ENTER**'	23) Display shows ***"REAd 0"*** Item #2 of coordinate #1.
Press '**RESET/ENTER**'	24) Display shows ***"xxxxxx"*** some 6-digit number with first digit flashing, represents the value of ***"REAd 0"*** item #2 of coordinate #1.
Press '**▲/MAX**' & '**▶/MIN**'	25) Use '**MAX**' and '**MIN**' buttons to enter new value of ***"REAd 0"***.
Press '**RESET/ENTER**'	26) Display shows ***"INPUt 1"*** Item #1 of coordinate #2. Continue to proceed with the selection and value entry, for ***"INPUt 0"*** and ***"REAd 0"*** for ***"INPUt 1"*** and ***"REAd 1"***, (item #1 and #2 of coordinate #2), similar to steps above.
Press '**RESET/ENTER**'	27) Display advances to ***"UNt.tMP"*** Temperature Unit selection Submenu. If an item # of coordinate # was prompted or modified, the controller will also show the ***"StOREd"*** stored message momentarily.

MANUAL

Press '**RESET/ENTER**'	28) ***"MANUAL"*** heading stops flashing.
Press '**RESET/ENTER**'	29) Display shows ***"INPUt 0"*** Item #1 of coordinate #1. Pressing 'RESET/ENTER' to sequence through: ***"INPUt 0"***, Input 0 's value ***"REAd 0"***, Read 0 's value ***"INPUt 1"***, Input 1 's value ***"REAd 1"***, Read 1 's value headings for the desired selection and continue using '**MAX**' and '**MIN**' buttons to manually enter or modify the values as described in the following section.
Press '**RESET/ENTER**'	30) Display shows ***"xxxxxx"*** some 6-digit number with first digit flashing, represents the value of ***"INPUt"*** item #1 of coordinate #1.
Press '**▲/MAX**' & '**▶/MIN**'	31) Use '**MAX**' and '**MIN**' buttons to enter new value of ***"INPUt 0"*** item #1 of coordinate #1.
Press '**RESET/ENTER**'	32) Display shows ***"REAd 0"***. Continue the sequential items with '**MAX**' & '**MIN**' buttons to select and enter values.
Press '**RESET/ENTER**'	33) Display advances to ***"UNt.tMP"*** Temperature Unit selection Submenu. If an item # of coordinate # was prompted or modified, the controller will also show the ***"StOREd"*** stored message momentarily.

14.2 *UNt.tMP* **Enter TEMPERATURE UNIT SELECTION SUBMENU:**

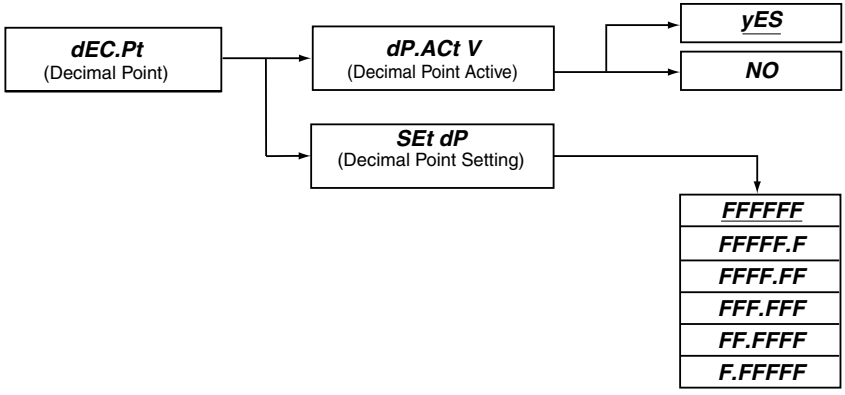
1) To enter TEMPERATURE UNIT SELECTION Submenu if display shows ***"UNt.tMP"*** (Second Item of ***"RdG.CNF"*** Menu).

Press '**RESET/ENTER**' 2) Display shows flashing ***"C"*** (default) and front display shows °C accordingly at the bottom right side or previous temperature Unit selection.

Press '**▲/MAX**' 3) Scroll through the 3 supported selections to the Temperature Unit of your choice: ***"C"***, ***"F"*** and ***"k"*** (°C, °F and °K units).

Press '**RESET/ENTER**' 4) Display advances to ***"dEC Pt"*** Decimal Point Setting Menu. If a change was made, the controller will also show the ***"StOREd"*** stored message momentarily.

14.3 *dEC Pt* **Enter DECIMAL POINT CONFIGURATION SUBMENU:**



Press '**RESET/ENTER**' 5) Display shows ***"dP.ActV"*** Decimal Point Effect Selection menu.

Press '**RESET/ENTER**' 6) Display flashes ***"yES"*** (default) as confirming that the decimal point position is active otherwise ***"NO"*** as independent.

Press '**▲/MAX**' 7) To scroll or select the desired effect for your setting.

Press '**RESET/ENTER**' 8) Display shows ***"StOREd"*** stored message momentarily then advances to ***"Set dP"*** Decimal Point Setting menu.

Press '**RESET/ENTER**' 9) Display shows ***"FFFFFF"*** (default) no decimal point option or previous selection of decimal point location.

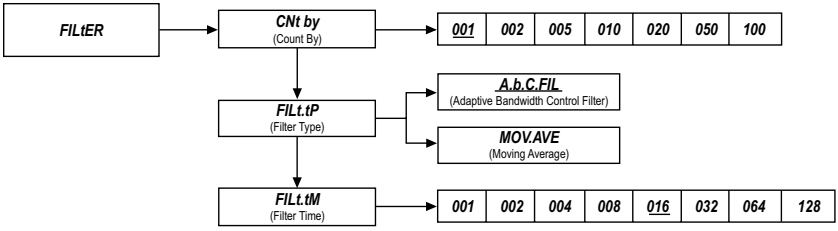
Press '**▲/MAX**' 10) Scroll through the 6 available selection as ***000000***, ***00000.0***, ***0000.00***, ***000.000***, ***00.0000***, and ***0.00000*** for the suitable choice to match your selected input range and type.

Press '**RESET/ENTER**' 11) Display advances to ***"FILtER"*** Filter Configuration submenu. If a change was made, the controller will also show ***"StOREd"*** stored message momentarily.

14.4 *FILtER* **Enter FILTER CONFIGURATION SUBMENU:**

Press '**RESET/ENTER**' 12) Display shows ***"CNt by"*** Counter by or round-off feature. To enter, Press '**RESET/ENTER**').

Press '**MENU**' 13) Scroll through 3 available selections of Filter configuration: ***"CNt by"***, ***"FILt.tP"*** and ***"FILt.tM"***. Refer to the flowchart below.



CNt by **Enter COUNT BY FILTER FUNCTION MENU:**

Press '**RESET/ENTER**' 14) Display flashes ***"001"*** (default) or previous setting value.

Press '**▲/MAX**' 15) Scroll though 7 available selections: ***001***, ***002***, ***005***, ***010***, ***020***, ***050*** and ***100*** for your choice of setting.

Press '**RESET/ENTER**' 16) Display advances to ***"FILt.tP"*** Filter Type Selection Menu. If a change was made, the controller will also show ***"StOREd"*** stored message momentarily.

FILt.tP **Enter FILTER TYPE SELECTION MENU:**

Press '**RESET/ENTER**' 17) Display flashes ***"A.b.C.F IL"*** **A**daptive **B**andwidth **C**ontrol **F**ilter.

Press '**▲/MAX**' 18) Scroll through 2 supported types: ***"A.b.C.F IL"*** or ***"MOV.AVE"*** (Moving Average) for your desired option.

Press '**RESET/ENTER**' 19) Display advances to ***"FILt.tM"*** Filter Type Selection Menu. If a change was made, the controller will also show the ***"StOREd"*** stored message momentarily.

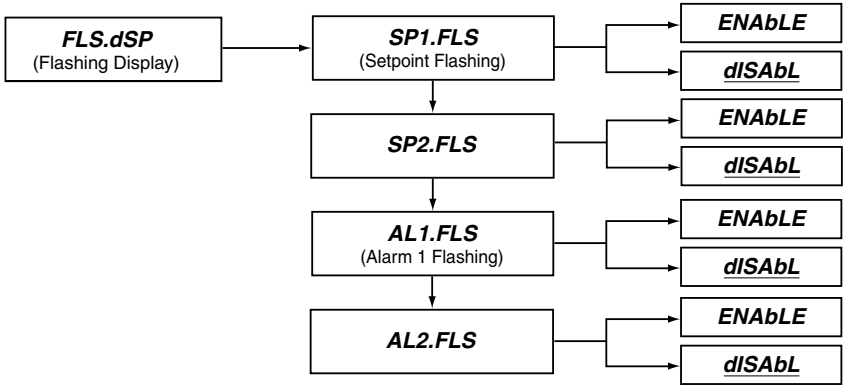
FILt.Tm **Enter FILTER TIME SETTING MENU:**

Press '**RESET/ENTER**' 20) Display flashes ***"004"*** (default) or previous setting value.

Press '**▲/MAX**' 21) Scroll though 8 available selections: ***001***, ***002***, ***004***, ***008***, ***016***, ***032***, ***068*** and ***128*** for your choice of setting.

Press '**RESET/ENTER**' 22) Display advances to ***"FLS.dSP"*** Flashing Display Setting Menu. If a change was made, the controller will also show the ***"StOREd"*** stored message momentarily.

14.5 *FLS.dSP* **Enter FLASHING DISPLAY CONTROL SUBMENU:**



Press '**RESET/ENTER**' 23) Display shows ***"SP1.FLS"*** Setpoint 1 Flashing.

Press '**RESET/ENTER**' 24) Display flashes ***"dISAbL"*** disable (default) or previous selection of control option.

Press '**MENU**' 25) Scroll though next available Setpoint/Alarm Display Flashing selections: ***"SP1.FLS"***, ***"SP2.FLS"***, ***"AL1.FLS"*** and ***"AL2.FLS"***.

Press '**▲/MAX**' 26) Display flashes ***"ENAbLE"*** or ***"dISAbL"***, select your choice of control.

Press '**RESET/ENTER**' 27) Display advances to next Setpoint/Alarm Display Flashing or ***"bRIGHt"*** Display Brightness Control Menu. If a change was made, the controller will also show ***"StOREd"*** stored message momentarily.

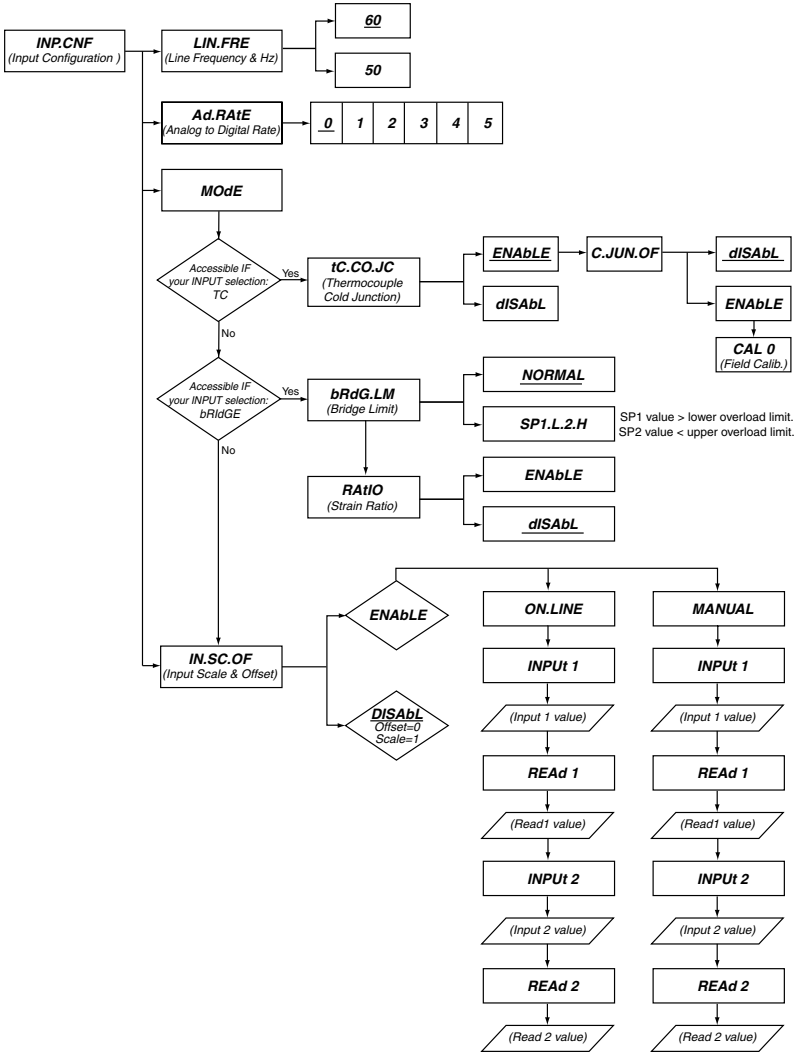
14.6 *bRIGHt* **Enter DISPLAY BRIGHTNESS CONTROL SUBMENU:**

Press '**RESET/ENTER**' 28) Display flashes ***"H.bRt"*** High Brightness Level.

Press '**▲/MAX**' 29) Scroll though 3 different Display brightness level: ***"H.bRt"*** (high), ***"M.bRt"*** (medium) and ***"L.bRt"*** (low) and select your choice of brightness level.

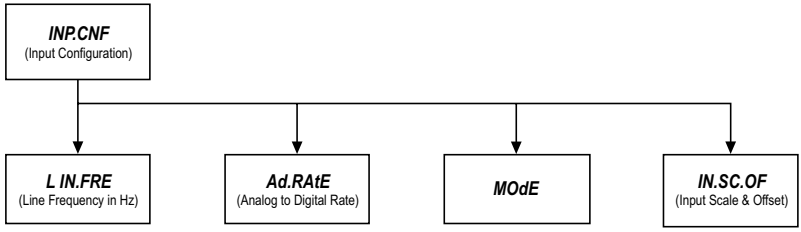
Press '**RESET/ENTER**' 30) Display advances to ***"INP.CNF"*** Input Configuration Menu. If a change as made, the controller will also show ***"StOREd"*** stored message momentarily.

15 INPUT CONFIGURATION FLOWCHART



16 INPUT CONFIGURATION MENU: (*INP.CNF*)

INP.CNF **ENTER INPUT CONFIGURATION MENU:**



Press '**MENU**'	1) Three times though Main Menu items and display shows ***"INP.CNF"***.
Press '**RESET/ENTER**'	2) Display shows ***"L IN.FRE"*** Line Frequency submenu.
Press '**MENU**'	3) Scroll through the following sequence of available Input Configuration Menu selection menu: ***"L IN.FRE"***, ***"Ad.RAtE"***, ***"MOdE"***, and ***"IN.SC.OF"*** (Line Frequency, Analog to Digital Rate, Input Mode and Input Scale & Offset).

16.1 ***L IN.FRE*** **Enter POWER LINE FREQUENCY SELECTION SUBMENU:**

To enter POWER LINE FREQUENCY SELECTION Submenu if display shows ***"L IN.FRE"***.

Press '**RESET/ENTER**'	4) Display shows flashing ***"60"*** in Hz (default) or previous frequency selection.
Press '**▲/MAX**'	5) Scroll through the 2 supported selections to the Frequency of your power line type: ***"60"*** or ***"50"*** Hz.
Press '**RESET/ENTER**'	6) Display advances to ***"Ad.RAtE"*** Analog to Digital Rate Submenu. If a change was made, the controller will also show ***"StOREd"*** stored message momentarily.

16.2 *Ad.RAtE* **Enter ANALOG TO DIGITAL RATE SUBMENU:**

Press '**RESET/ENTER**' 7) Display flashes ***"0"*** or previous selection.

Press '**▲/MAX**' 8) Scroll through the 6 available selections as ***0***, ***1***, ***2***, ***3***, ***4***, and ***5*** for your choice of selection. Refer to below Table for your specific application conversion speed. Only Rate 0 and 1 can reject 60 Hz / 50 Hz noise. Refer to **Table 33-1** in Specification Section for different input and outputs types.

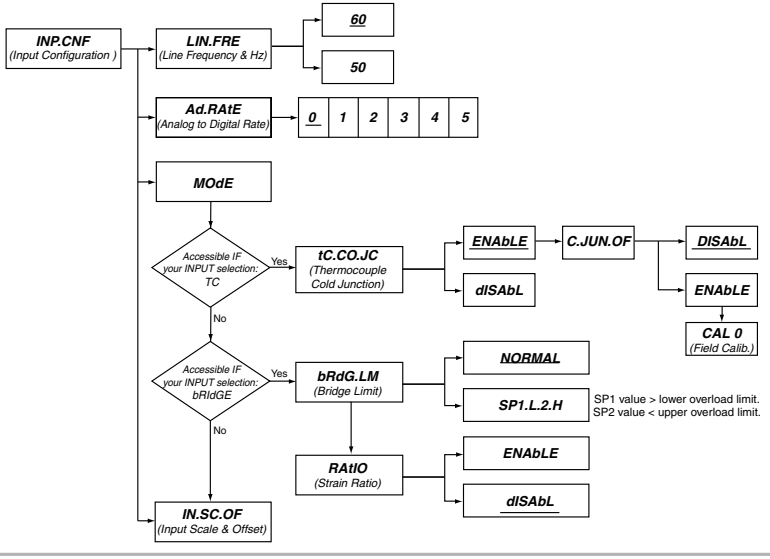
Rate	0	1	2	3	4	5
Time for 60hz(ms)	134.9	68.2	34.9	18.2	9.9	5.7
Time for 50Hz(ms)	161.9	81.9	41.9	21.9	11.9	6.9

Table 16-1. A/D (Analog to Digital) Rate Option Table

Press '**RESET/ENTER**' 9) Display advances to ***"MOdE"*** Input Mode Configuration Submenu. If a change was made, the controller will also show ***"StOREd"*** stored message momentarily.

16.3 *MOdE* **Enter INPUT MODE CONFIGURATION SUBMENU:**

Note This submenu is only accessible if ***"tC"*** Thermocouple or ***"bRIdGE"*** Bridge is your selection of input type.



In case of "*tC*" input type:

Press '**RESET/ENTER**' 10) Display shows ***"tC.CO.JC"*** Cold-Junction Compensation for ***"tC"*** Thermocouple input type.
Press '**RESET/ENTER**' 11) Display flashes ***"ENAbLE"*** as default or previous selection.
Press '**▲/MAX**' 12) To select either ***"ENAbLE"*** or ***"dISAbL"*** for your choice of setup.
Press '**RESET/ENTER**' 13) Display shows ***"C.JUN.OF"*** Cold-Junction Offset Adjustment menu.
Press '**RESET/ENTER**' 14) Display flashes ***"dISAbL"*** as default.

16.3.1 FIELD CALIBRATION FOR COLD JUNCTION COMPENSATION BOARD

CAL 0 **Enter " CAL 0 " FIELD CALIBRATION SUBMENU:**

* The meter has been calibrated with the cold-junction compensation board included with your unit. However if you change the board or want to verify the calibration, this controller has technologically featured with ***" CAL 0 "*** menu function for Field Calibration to perform Cold-Junction Offset Adjustment automatically as described in the following steps.

* **Caution:** Before attempting to calibrate, make sure you have the proper equipment for calibration and follow the procedure precisely.
* The communication Bus Format, ***"bUS.FMt"***, must be in Command Mode, ***"COMMNd"***.
* RTD and Process are perfectly calibrated; this calibration is only applicable to TC.
  Equipment required: Select proper TC type that you need to calibrate and set your calibrator for 0°C / 32°F. Having applied power, let the setup warm-up, for at least one hour, prior to performing Field Calibration.

Press '**▲/MAX**' 15) Select ***"ENAbLE"*** to enter FIELD CALIBRATION mode for Cold-Junction Offset Adjustment.
Press '**RESET/ENTER**' 16) Display advances to ***"CAL 0"*** Field Calibration submenu for Cold-Junction Offset Adjustment.

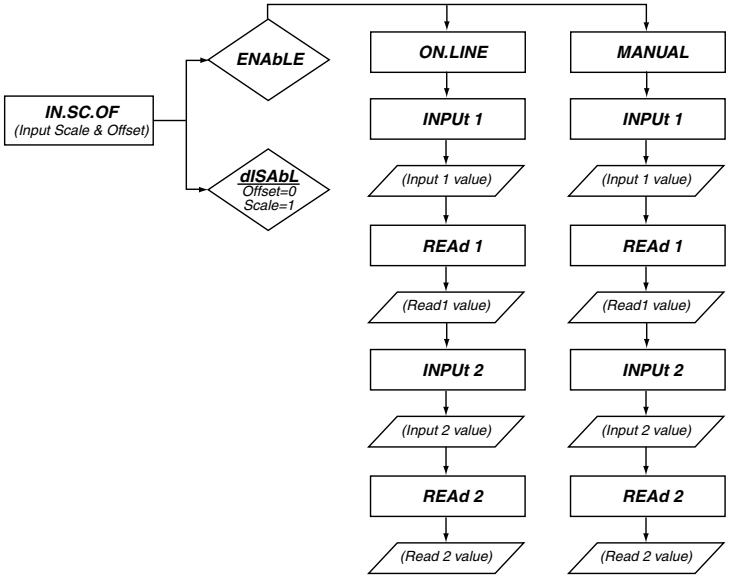
*The following Step 17 is a safety measure to prevent unintentional calibration.

Press '**▲/MAX**' 17) Display still shows ***"CAL 0"*** Submenu.
Press '**RESET/ENTER**' 18) Display shows ***"StOREd"*** stored message (meaning the calibration is complete) momentarily and advances to ***"IN.SC.OF"*** Input Scale & Offset configuration Submenu.

In case of "*bRIdGE*" input type:

Press '**RESET/ENTER**' 19) Display shows ***"bRdG.LM"*** Bridge Limit function menu.
Press '**RESET/ENTER**' 20) Display flashes ***"NORMAL"*** or the previous setting.
Press '**▲/MAX**' 21) Scroll the available options of setting: ***"NORMAL"*** or ***"SP1.L.2.H"*** (Setpoint 1 value would be lower overload limit and Setpoint 2 would be upper overload limit) for your choice of setting.
Press '**RESET/ENTER**' 22) Display advances to ***"RAt IO"*** Ratiometric input reading or measurement setup menu. If a change was made, the controller will also show ***"StOREd"*** stored message momentarily.
Press '**RESET/ENTER**' 23) Display flashes ***"dISAbL"*** or previous setup option.
Press '**▲/MAX**' 24) To select either ***"ENAbLE"*** or ***"dISAbL"*** for your choice of setup.
Press '**RESET/ENTER**' 25) Display advances to ***"IN.SC.OF"*** Input Scale & Offset Configuration Submenu or measurement setup menu. If a change was made, the controller will also show the ***"StOREd"*** stored message momentarily.

16.4 *IN.SC.OF* **Enter INPUT SCALE & OFFSET CONFIGURATION SUBMENU:**



Press '**RESET/ENTER**' 26) Display flashes ***"dISAbL"*** (default) or previous selection.
Press '**▲/MAX**' 27) To select either ***"ENAbLE"*** or ***"dISAbL"*** for your choice of setup.
Press '**RESET/ENTER**' 28) Select ***"ENAbLE"***, display flashes ***"ON.LINE"*** (default) or previous selection.
Press '**▲/MAX**' 29) To select either ***"ON.LINE"*** or ***"MANUAL"*** for your choice of Input Scale & Offset Configuration.

ON.L INE

Press '**RESET/ENTER**'	30) Display flashes ***"ON.L INE"*** On line method.
Press '**▲/MAX**'	31) Scroll between 2 available selections: ***"ON.L INE"*** or ***"MANUAL"*** for the configuration option of your choice. If your choice of selection is ***"MANUAL"***, skip to Step 40).
Press '**RESET/ENTER**'	32) Display stops flashing and shows "ON.L INE".
Press '**RESET/ENTER**'	33) Display shows ***"INPUt 0"*** Item #1 of coordinate #1. Pressing '**RESET/ENTER**' to sequence through ***"INPUt 0"***, Input 0 's value ***"REAd 0"***, Read 0 's value ***"INPUt 1"***, Input 1 's value ***"REAd 1"***, Read 1 's value headings for the desired selection to enter new value.
Press '**RESET/ENTER**'	34) Display shows ***"xxxxxx"*** some 6-digit number, represents the value of ***"INPUt 0"*** as taken from live input source measurement for desired value.
Press '**RESET/ENTER**'	35) Display shows ***"REAd 0"*** Item #2 of coordinate #1.
Press '**RESET/ENTER**'	36) Display shows ***"xxxxxx"*** some 6-digit number with first digit flashing, represents the value of ***"REAd 0"*** item #2 of coordinate #1.
Press '**▲/MAX**' & '**►/MIN**'	37) Use '**MAX**' and '**MIN**' buttons to enter new value of "REAd 0".
Press '**RESET/ENTER**'	38) Display shows ***"INPUt 1"*** Item #1 of coordinate #2. Continue to proceed with the selection and value entry for ***"INPUt 0"*** and ***"REAd 0"*** for ***"INPUt 1"*** and ***"REAd 1"***, (item #1 and #2 of coordinate #2) similar to steps above.
Press '**RESET/ENTER**'	39) Display advances to ***"MP.SC.OF"*** Multi-Scale & Offset configuration menu. If ***"REAd 1"*** item #2 of coordinate #2 was prompted or modified, the controller will also show ***"StOREd"*** stored message momentarily.

MANUAL

Press '**RESET/ENTER**'	40) "***MANUAL***" heading stops flashing.
Press '**RESET/ENTER**'	41) Display shows ***"INPUt 0"*** Item #1 of coordinate #1. Pressing '**RESET/ENTER**' to sequence through ***"INPUt 0"***, Input 0 's value ***"REAd 0"***, Read 0 's value ***"INPUt 1"***, Input 1 's value ***"REAd 1"***, Read 1 's value headings for the desired selection and continue using '**MAX**' and '**MIN**' buttons to manually enter or modify the values as described the below section.
Press '**RESET/ENTER**'	42) Display shows ***"xxxxxx"*** some 6-digit number with first digit flashing, represents the value of ***"INPUt 0"*** item #1 of coordinate #1.
Press '**▲/MAX**' & '**►/MIN**'	43) Use '**MAX**' and '**MIN**' buttons to enter new value of ***"INPUt 0"*** item #1 of coordinate #1.
Press '**RESET/ENTER**'	44) Display shows ***"REAd 0"***. Continue with the sequential items and use '**MAX**' & '**MIN**' buttons to select and enter values.
Press '**RESET/ENTER**'	45) Display advances to ***"MP.SC.OF"*** Multi-point Scale & Offset Configuration Menu. If ***"REAd 1"*** item #2 of coordinate #2 was prompted or modified, the controller will also shows ***"StOREd"*** stored message momentarily.

SCALING YOUR METER
Scaling your meter without a sensor or a signal source connected is easily accomplished by using one of the calculated scale factors as shown in Table below.

Scaling to Display Engineering Units
These calculated scale factors are the numbers that your meter would display if you connected a signal source.

You must complete the procedure for preparing your meter for Scaling as described in **Section 16.4** "**IN.SC.OF**" INPUT SCALE & OFFSET, "**MANUAL**". Failure to complete this procedure will result in erroneous readings.

Input Signal Range	0-20mA	4-20mA	±50mV	±500mV	0-20mV	0-30mV
Scale Input 0 Value	000000	000000	-50000	-50000	000000	000000
Scale Input 1 Value	020000	020000	050000	050000	020000	030000
Input Signal Range	0-50mV	0-100mV	0-1V	0-5V	1-5V	1-6V
Scale Input 0 Value	000000	000000	000000	000000	010000	010000
Scale Input 1 Value	050000	100000	100000	050000	050000	060000
Input Signal Range	0-10V	0-50V	0-100V	±5V	±50V	
Scale Input 0 Value	000000	000000	000000	-50000	-50000	
Scale Input 1 Value	100000	050000	100000	050000	050000	

Table 16-2. Factory Calculated Scale Factors Table

For the purpose of this procedure, we will use an input of 0-50 mVdc and scale the meter to display 0 to 2500.0. The calculated scale factors can now be used to scale your meter to display in engineering units using Input Scale and Offset ("**IN.SC.OF**") as follows:

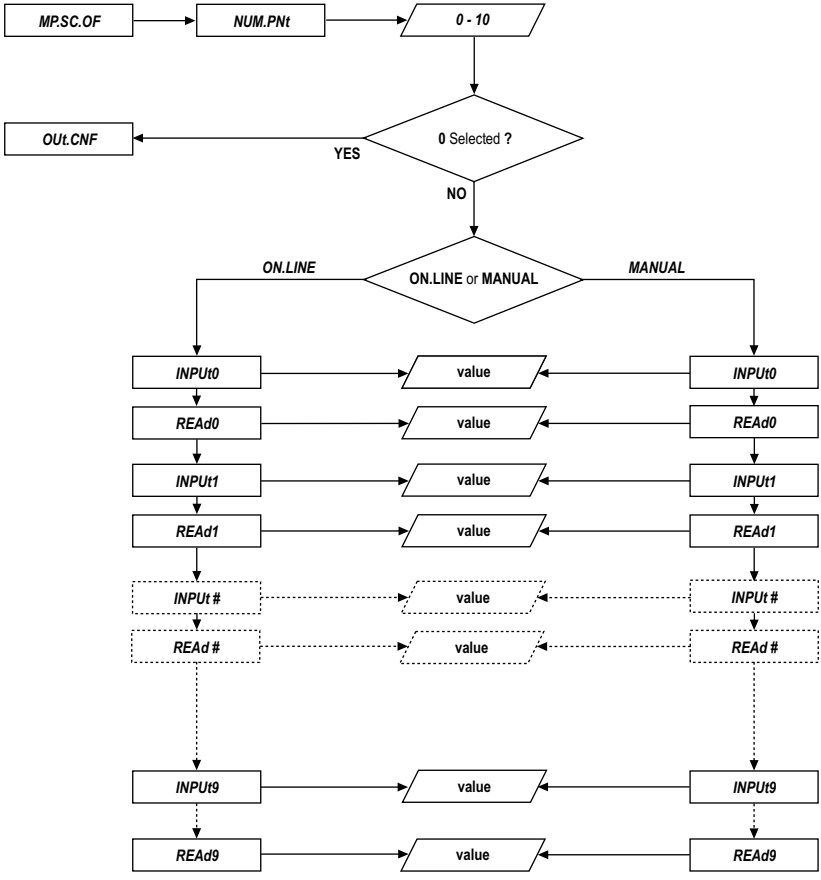
Record your ***"INPUT1"*** and ***"READ 1"*** numbers, and your ***"INPUT2"*** and ***"READ 2"*** numbers, record them below and proceed as follows:

Example
INPUT1 = 000000
READ 1 = 000000
INPUT2 = 050000
READ 2 = 025000

For more detail of Scale & Offset's examples, formulas and Calculation Table, Refer to **Section 18** of **MULTI-POINT SCALE & OFFSET MENU CONFIGURATION**.

Multi-Point Scale and Offset Menu Configuration Flowchart

17 MULTI-POINT SCALE & OFFSET MENU CONFIGURATION FLOWCHART



18 MULTI-POINT SCALE & OFFSET MENU CONFIGURATION: (*MP.SC.OF*)

Note For proper Multipoint Scale & Offset Configuration, user must enter the first Input (Input0) with least value, then the next one with the greater value and so forth...therefore the last one (Input4) must be entered with the greatest value in the manner shown in the following example:

Negative numbers are shown, as a worst case scenario, even though the same rule applies to positive values and to a sequence of negative values transitioning to positive values.

This scaling method based on 2 Input values entered with 2 corresponding readings. Up to 10 Linearization Points can be selected to customize the transducer curve.

MP.SC.OF	**Enter MULTI-POINT SCALE & OFFSET MENU:**
Press '**MENU**'	1) Four times or scroll though Main Menu items, select and enter ***"MP.SC.OF"***.
Press '**RESET/ENTER**'	2) Display shows ***"NUM.PNt"*** Number of Points menu.
Press '**RESET/ENTER**'	3) Display flashes some 2-digit number or previous setting which represents the number of Scale & Offset points.
Press '**▲/MAX**'	4) Scroll through ***"00"*** to ***"09"*** for your choice of Scaling method that allows users to select up to 10 points for transducer curve's linearization purposes.
Press '**RESET/ENTER**'	5) Display shows ***"StOREd"*** momentarily then advances to ***"OUt.CNF"***, if ***"00"*** was selected. Otherwise displays will flash either of the following 2 options: ***"ON.L INE"*** or ***"MANUAL"***. Select your choice for Scaling method.

ON.L INE	**IF "*ON.L INE*" and "*NUM.PNt*" = 01 are YOUR CHOICE:** (On-Line Calibration with 2 points)
Press '**RESET/ENTER**'	6) Display stops flashing ***"ON.L INE"*** On-line Calibration or Scaling.
Press '**RESET/ENTER**'	7) Display shows ***"INPUt 0"***.
Press '**RESET/ENTER**'	8) Display shows the actual live-input signal being received and equal to approximately the minimum input signal or 0% of known load range.
Press '**RESET/ENTER**'	9) Display shows ***"StOREd"*** momentarily and advances to ***"READ 0"***.
Press '**RESET/ENTER**'	10) Display shows last stored value of ***"READ 0"*** with 1st digit flashing.
Press '▲**/MAX**' & ' ▶**/MIN**'	11) To enter the value of ***"READ 0"***.
Press '**RESET/ENTER**'	This value corresponds to ***"INPUt 0"*** in terms of some meaningful engineering units. To show ***"INPUt 0"*** as minimum or 0% as enter ***"READ 0"*** value = ***000000*** (Example)
Press '**RESET/ENTER**'	12) Display shows ***"INPUt 1"***.
Press '**RESET/ENTER**'	13) Display shows the 2nd higher live-input signal being connected for your preference as equal to approximately 100% of the transducer range or the max. Input signal.
Press '**RESET/ENTER**'	14) Display shows ***"StOREd"*** momentarily and advances to ***"READ 1"***.
Press '**RESET/ENTER**'	15) Display shows last stored value of "**REAd 1**" with 1st digit flashing.
Press '▲**/MAX**' & ' ▶**/MIN**'	16) To enter the value of ***"READ 1"***. This value corresponds to ***"INPUt 1"*** in term of some meaningful engineering units. To show ***"INPUt 1"*** as maximum or 100% as enter ***"READ 1"*** value = 000100 (example).
Press '**RESET/ENTER**'	17) Display shows ***"StOREd"*** momentarily and advances to ***"OUt.CNt"*** Output configuration menu.

MANUAL	IF ***"MANUAL"*** and ***"NUM.PNt"=01*** are YOUR CHOICE (Scaling without Known Loads or based on specifications)

To scale ***"MANUAL"***, calculate inputs based on transducer specifications and manually enter them via on the front panel push buttons. The following example assumes load cells with this specification:

Maximum Load:.....100.0 lb
Output .....3.0 mV/V
Sensor Excitation .....10 V
Maximum Sensor Output = 3.0(mV/V) x 10(V) = 30mV

18 Multi-Point Scale and Offset Menu Configuration

Determine the correct values for Inputs (***"INPUt 0"*** and ***"INPUt 1"***). Calculate ***"INPUt 0"*** and ***"INPUt 1"*** using the following equation:

"INPUt" = (Sensor Output) x (Conversion Number)

Tip Conversion number is a coefficient of conversion between input values and real full display range (100000 counts). See table below for proper conversion number.

INPUT RANGE	CONVERSION NUMBER
0 – 100 mV	100000/(100 x 1)=1000cts/mV
0 - 1 V	100000/(1000 x 1)= 100cts/V
0 - 10 V	100000/(1000 x 10)= 10cts/V
0 – 20 mA	20000/ (20 x 1) = 1000cts/mA

Table 18-1. Conversion Number Table

Determine ***"INPUt 0"*** and ***"INPUt 1"*** Input range. For our transducer select 0 – 100 mV range.

"**INPUt 0**" = 0 (mV) x 1000(cts/mV) = ***000000***
"**INPUt 1**" = 30 (mV) x 1000(cts/mV) = ***030000***

1. Determine correct values for Display Reading (***"REAd 0"*** and ***"REAd 1"***)
2. In most cases,***"REAd 0"*** and ***"REAd 1"*** are equal to the minimum and the maximum of the transducer output range.

"REAd 0" = 000000
"REAd 1" = 000100

3. Scaling the controller.

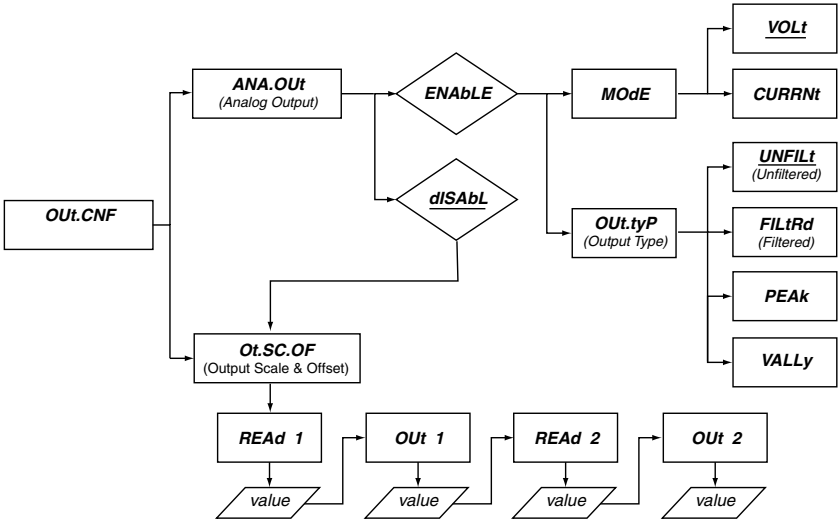
Press '**RESET/ENTER**' 18) Display stops flashing ***"MANUAL"*** Manual Scaling method menu.
Press '**RESET/ENTER**' 19) Display shows ***"StOREd"*** momentarily and advances to ***"INPUt 0"*** heading.
Press '**RESET/ENTER**' 20) Display shows last stored ***"INPUt 0"*** value with 1st digit flashing.
Press '**▲/MAX**' & '**▶/MIN**' 21) To enter ***"INPUt 0"*** value (000000)
Press '**RESET/ENTER**' 22) Display advances to ***"REAd 0"*** heading.
Press '**RESET/ENTER**' 23) Display shows last stored ***"REAd 0"*** value with 1st digit flashing.
Press '**▲/MAX**' & '**▶/MIN**' 24) To enter ***"REAd 0"*** value (000000).
Press '**RESET/ENTER**' 25) Display shows ***"INPUt 1"*** heading.
Press '**RESET/ENTER**' 26) Display shows last stored ***"INPUt 1"*** value with 1st digit flashing.
Press '**▲/MAX**' & '**▶/MIN**' 27) To enter ***"INPUt 1"*** value (030000).
Press '**RESET/ENTER**' 28) Display advances to ***"REAd 1"*** heading.
Press '**RESET/ENTER**' 29) Display shows last stored ***"REAd 1"*** value with 1st digit flashing.
Press '**▲/MAX**' & '**▶/MIN**' 30) To enter ***"REAd 0"*** value (000100).
Press '**RESET/ENTER**' 31) Display shows ***"StOREd"*** momentarily and advances to ***"OUt.CNF"*** Output Configuration Menu.

INPUt value = Xin	**RS** = Reading Scale	**RO** = Reading Offset
Display Reading Value = Yrd	**IS** = Input Scale	**IO** = Input Offset
(.) : Multiplication	**MS** = Multi Scale	**MO** = Multi Offset

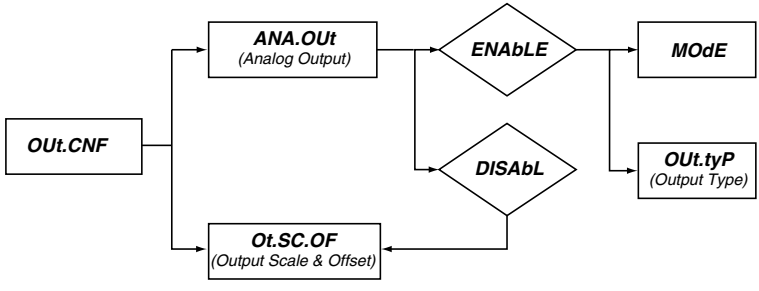
READING/INPUT SCALE & OFFSET MODE			**DISPLAY READING VALUES** (y = ax + b)
MP.SC.OF	**IN.SC.OF**	**Rd.SC.OF**	Yrd = (SCALE).Xin + (OFFSET)
disable disable **enable**	disable **enable** disable	**enable** disable disable	RS.Xin + RO IS.Xin + IO MS.Xin + MO
disable **enable** **enable**	**enable** **enable** disable	**enable** disable **enable**	RS.(IS.Xin + IO) + RO IS.(MS.Xin + MO) + IO RS.(MS.Xin + MO) + RO
enable	**enable**	**enable**	RS.[IS.(MS.Xin + MO) + IO] + RO

Table 18-2. Reading / Input Scale & Offset Calculation Table

19 OUTPUT CONFIGURATION MENU FLOWCHART



20 OUTPUT CONFIGURATION MENU: (*OUt.CNF*)

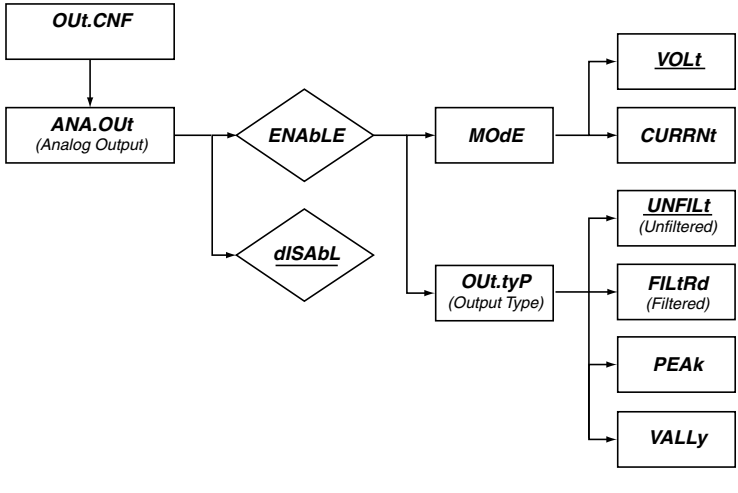


OUt.CNF **Enter OUTPUT CONFIGURATION MENU:**

Press '**MENU**' 1) 5 times or scroll though main Menu until Display shows ***"OUt.CNF"*** Output Configuration Menu.

20.1 *ANA.OUt*

Press '**RESET/ENTER**' 2) Display shows ***"ANA.OUt"*** Analog Output Configuration submenu.
Press '**RESET/ENTER**' 3) Display flashes ***"dISAbL"*** (Default) or previous setting option.
Press '▲**/MAX**' 4) Select ***"ENAbLE"*** to setup Analog Output if your controller is equipped with the optional Analog Output board.



20 Output Configuration Menu

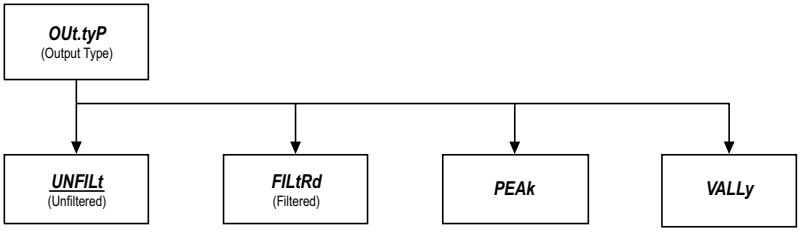
MOdE **Enter OUTPUT MODE CONFIGURATION SUBMENU:**

Press '**RESET/ENTER**' 5) Display shows ***"StOREd"*** stored message momentarily and advances to ***"MOdE"*** to allow users to select Output type as Voltage (0-10Vdc or Current (4-20mA-dc) source.

Press '**RESET/ENTER**' 6) Display flashes ***"VOLt"*** (default) DC-Voltage output option or previous selection (***"CURRNt"*** DC-Current output).

OUt.tyP **Enter OUTPUT TYPE CONFIGURATION SUBMENU:**

Press '**RESET/ENTER**' 7) Display shows ***"OUt.tyP"*** Output Type Submenu.

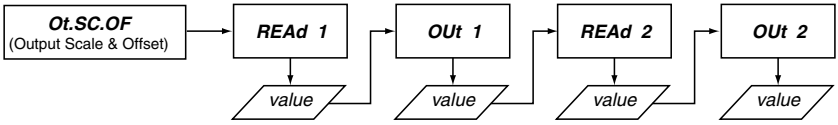


Press '**RESET/ENTER**' 8) Display flashes ***"UNF ILt"*** Unfiltered option or previous selection.

Press '**▲/MAX**' 9) Scroll though and select the following options for your choice of setting:

"UNF ILt" :Transmits the unfiltered value of your signal input.
"FILtRd" : Transmits the filtered value of your signal input.
"PEAk" : Transmits the recorded Peak ***"HI RdG"*** Reading value(s).
or
"VALLy" : Transmits the recorded Valley ***"LO RdG"*** Reading value(s).

20.2 *Ot.SC.OF* **Enter OUTPUT SCALE & OFFSET CONFIGURATION SUBMENU:**



READING 1

Press '**RESET/ENTER**' 10) Display shows ***"REAd 1"*** Reading 1 menu.
Press '**RESET/ENTER**' 11) Display flashes 1st digit of previous ***"REAd 1"*** value.
Press '▲**/MAX**' & ' ▶**/MIN**' 12) Enter ***"REAd 1"*** value. (Example 000000).
Press '**RESET/ENTER**' 13) Display advances to ***"OUt 1"*** Output 1 menu.

OUTPUT 1

Press '**RESET/ENTER**' 14) Display flashes 1st digit of previous ***"OUt 1"*** value.
Press '▲**/MAX**' & ' ▶**/MIN**' 15) Enter ***"OUt 1"*** value. (Example 0000.00).
Press '**RESET/ENTER**' 16) Display advances to ***"REAd 2"*** Reading 2 menu.

READING 2

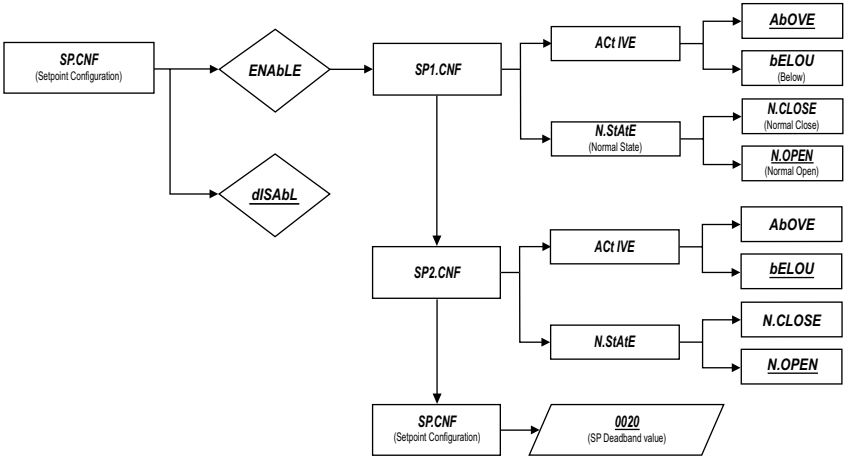
Press '**RESET/ENTER**' 17) Display flashes 1st digit of previous ***"REAd 2"*** value.
Press '▲**/MAX**' & ' ▶**/MIN**' 18) Enter ***"REAd 2"*** value. (Example 999999).
Press '**RESET/ENTER**' 19) Display advances to ***"OUt 2"*** Output 2 menu.

OUTPUT 2

Press '**RESET/ENTER**' 20) Display flashes 1st digit of previous ***"OUt 2"*** value.
Press '▲**/MAX**' & ' ▶**/MIN**' 21) Enter ***"OUt 2"*** value. (Example ***0010.00***).
Press '**RESET/ENTER**' 22) Display Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"SP CNF"*** SetPoint Configuration menu.

Note ☞ The above example is for 0-10 V of the entire range of the process input and analog output. For 0-20mA output you need to set ***"MOdE"*** to ***"CURRNt"*** DC-Current output and ***"OUt 2"*** to ***0020.00***.

21 SETPOINT CONFIGURATION MENU FLOWCHART



22. SETPOINT CONFIGURATION MENU: (*SP.CNF*)

Setpoints 1 through 4 can be configured for a very large variety of zone and level signaling.

SP1 and SP2 have balanced configurable hysteresis and are non-latching, suitable for control-level signaling.

SP3 and SP4 are often used as Alarm1 and Alarm2, because they have single-sided hysteresis and can be configured for latching action.

The levels of these Setpoints are entered during run mode via the front-panel pushbuttons (refer to Setpoint Settings Menu Configuration **Sections 8**) and many performance options are selected during the configuration mode in the following sections.

SP.CNF	**ENTER SETPOINT CONFIGURATION MENU:**
Press '**MENU**'	1) Six times, display shows ***"SP.CNF"*** Setpoint Configuration Menu.
Press '**RESET/ENTER**'	2) Display flashes ***"dISAbL"*** (default) or previous selection.
Press '**▲/MAX**'	3) Select ***"ENAbLE"*** to configure Setpoint 1 and Setpoint 2.

22 Setpoint Configuration Menu

SP1.CNF

Press '**RESET/ENTER**'	4) Display shows ***"StOREd"*** stored message momentarily and then advances to ***"SP 1.CNF"*** Setpoint 1 configuration submenu. If necessary, press '**MENU**' to select the other available following submenu: ***"SP 2.CNF"*** Setpoint 2 Configuration and ***"SP db"*** Setpoint Deadband Configuration Submenu. See Steps 12 through 16 for details.
Press '**RESET/ENTER**'	5) Display shows ***"ACt IVE"*** Setpoint Active State menu.
Press '**RESET/ENTER**'	6) Display flashes ***"AbOVE"*** Above Setpoint active state option or previous setting.
Press '▲**/MAX**'	7) Scroll to select 2 available choices: ***"AbOVE"*** or ***"bELOU"*** (below) Setpoint Active State.
Press '**RESET/ENTER**'	8) Display shows ***"StOREd"*** stored message momentarily and then advances to ***"N.StAtE"*** Normal State (Open-collector or Relay Output active state) menu.
Press '**RESET/ENTER**'	9) Display flashes ***"N.OPEN"*** Normal Open (Output collector or Relay opened) state or previous setting ***"N.CLOSE***" Normal Close (Output Relay closed) state.
Press '▲**/MAX**'	10) Select your choice of Output Relay state setting.
Press '**RESET/ENTER**'	11) Display shows ***"StOREd"*** stored message momentarily and then advances to ***"SP 2.CNF***" Setpoint 2 Configuration Menu.

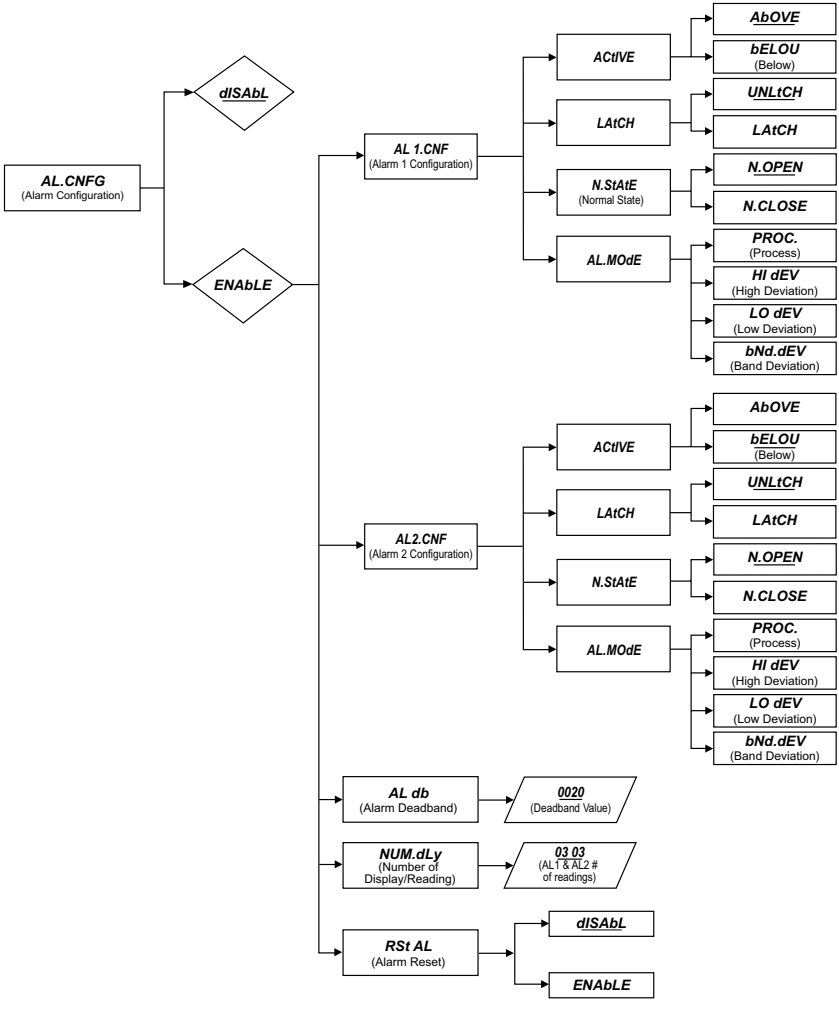
SP2.CNF

Press '**RESET/ENTER**' & '▲**/MAX**'	12) ***"SP 2.CNF***" Setpoint 2 Configuration submenu items are identical to ***"SP 1.CNF"***, proceed with your choices of setting then display advances to ***"SP db"*** Setpoint Deadband Menu.
Press '**RESET/ENTER**'	13) Display shows ***"StOREd"*** stored message momentarily and then advances to ***"SP db"*** Setpoint Deadband Configuration Submenu. Setpoint Deadband is used to select the amount of hysteresis for the setpoints programmable from ***"0000***" to ***"9999"***).

SP db

Press '**RESET/ENTER**'	14) Display shows some 4-digit number (0020 as default) of previous setting with the first digit flashing.
Press '▲**/MAX**' & ' ▶**/MIN**'	15) To modify the value of Setpoint Deadband.
Press '**RESET/ENTER**'	16) Display shows ***"StOREd"*** stored message momentarily and then advances to ***"AL CNF***" Alarm Configuration Menu.

23 ALARM CONFIGURATION MENU FLOWCHART



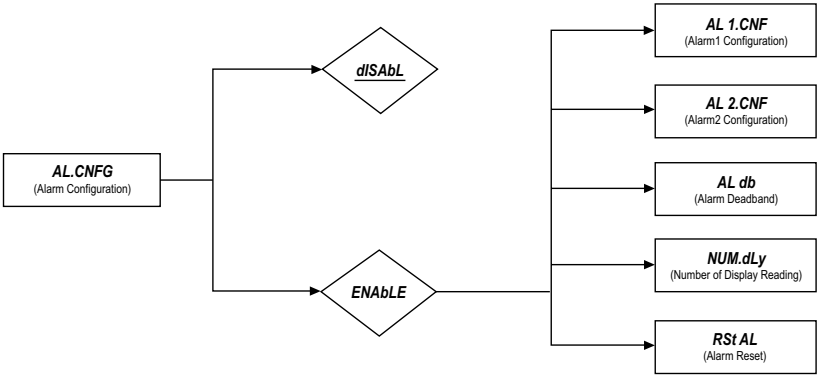
24 Alarm Configuration Menu

24 ALARM CONFIGURATION MENU: (*AL.CNFG*)

SP3 and SP4 are often used as Alarm1 and Alarm2, because they have single-sided hysteresis and can be configured for latching action. The levels of these Setpoints are entered during run mode via the front-panel pushbuttons (refer to Setpoint Settings Menu Configuration **Section 8**).

Alarm configuration is used to select or setup:

* The Active Zone for each alarm point (SP3 or AL1, SP4 or AL2) to above or below the setting with ***"Act IVE"*** submenu.
* Independent or ganged operation for SP3 / AL1 or SP4 / AL2 whether or not they should latch once triggered, ***"LAtCH"*** submenu.
* Whether the normal state of Output Collector or Relay is opened or closed with ***"N.StAtE"*** submenu.
* Following Alarm modes: process (no deviation), high-deviation, low-deviation and band deviation with ***"AL.MOdE"*** submenu.
* The amount of hysteresis or Deadband for the Setpoint3/Alarm1 or Setpoint4/Alarm2 with ***"AL db"*** submenu.
* Delays in Alarm Action with ***"NUM.dLy"*** submenu.
* Enable or disable Alarm points with ***"RSt AL"*** submenu.

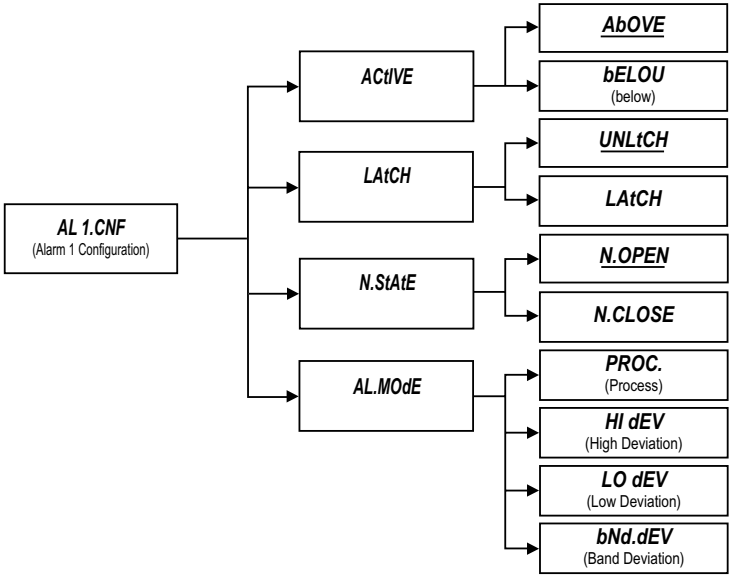


AL.CNFG	**ENTER ALARM CONFIGURATION MENU:**
Press '**MENU**'	1) 7 times, Display shows ***"AL.CNFG"*** Alarm Configuration Menu.
Press '**RESET/ENTER**'	2) Display flashes ***"dISAbL"*** (default) or previous selection.
Press '**▲/MAX**'	3) Select ***"ENAbLE"*** to configure Alarm1 (SP3) and Alarm2 (SP4).

24.1. *AL 1.CNF* **Enter ALARM 1 CONFIGURATION MENU:**

Press '**RESET/ENTER**' 4) Display shows ***"StOREd"*** stored message momentarily and then advance to ***"AL 1.CNF"*** Alarm1 configuration submenu.

If necessary, Press '**MENU**' to enter the other available following submenu: ***"AL 2.CNF"*** Alarm2 Configuration, ***"AL db"*** Alarm Deadband Configuration, ***"NUM.dLy"*** Number of display/reading configuration, ***"RSt AL"*** Alarm Reset Submenu. Refer to Steps 19 through 30 for details.



Alarm Configuration Menu

ACt IVE

Press '**RESET/ENTER**'	5) Display shows ***"ACt IVE"*** Alarm Active State submenu.
Press '**RESET/ENTER**'	6) Display flashes ***"AbOVE"*** Above Alarm/Setpoint active state option or previous setting.
Press '**▲/MAX**'	7) Scroll to select 2 available options for your choice ***"AbOVE"*** or ***"bELOU"*** (below) Alarm/Setpoint Active State.
Press '**RESET/ENTER**'	8) Display shows ***"StOREd"*** stored message momentarily and then advances to ***"LAtCH"*** Alarm Latching submenu.

LAtCH

Press '**RESET/ENTER**'	9) Display flashes ***"UNLtCH"*** Unlatch Option or previous setting.
Press '**▲/MAX**'	10) Scroll to select 2 available options for your choice: ***"UNLtCH"*** (unlatch) Non-Latching or ***"LAtCH"*** Latching Action. This means that once Alarm1 (Setpoint3) is triggered it will remain active, if ***"LAtCH"*** was selected, until it is reset by pressing the '**RESET/ENTER**' button one time or by grounding connector P2-11. Reset can also be accomplished via RS-232 or RS-485 serial communication option board.

N.StAtE

Press '**RESET/ENTER**'	11) Display shows ***"StOREd"*** stored message momentarily and then advances to ***"N.StAtE"*** Normal State (Output-transistor Collector or Relay state) submenu.
Press '**RESET/ENTER**'	12) Display flashes ***"N.OPEN"*** Normal Open (Output Relay or Output-Transistor Collector opened) state or previous setting ***"N.CLOSE"*** Normal close state.
Press '**▲/MAX**'	13) Select your choice of Output Relay or Output-transistor Collector state setting.

AL.MOdE

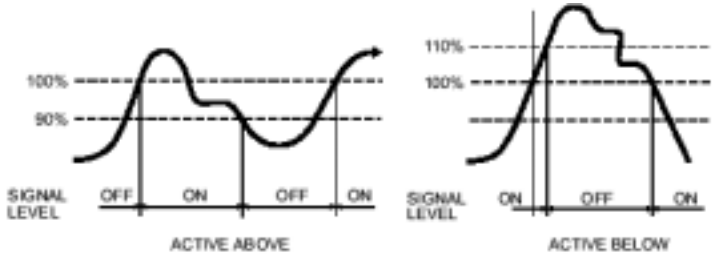
Alarm Mode or Deviation functions apply to Alarms 1 and 2 (Setpoints 3 and 4) and act as buffer zones to control setpoint action. The Alarm 1 deviation is the sum of the Alarm 1 value plus the Setpoint1 value the Alarm 2 deviation is the Alarm 2 value plus the Setpoint 2 value.

Press '**RESET/ENTER**'	14) Display shows ***"StOREd"*** stored message momentarily and then advances to ***"AL.MOdE"*** Alarm Mode (Function) Configuration submenu.

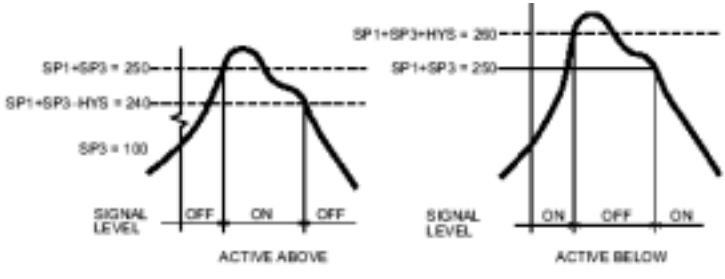
Note

There are 4 types of Alarm modes/Deviation Functions which can alter the alarm response as flowing illustrations:

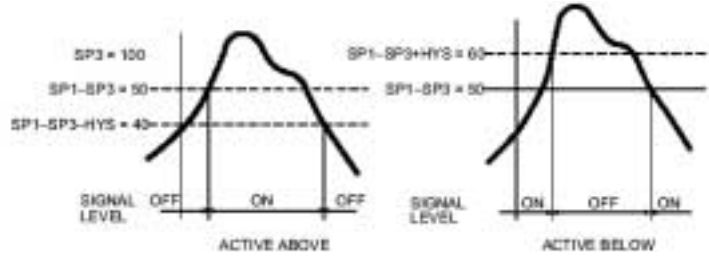
All horizontal axes represent time line.



"PROC." : Process Deviation (No Deviation)

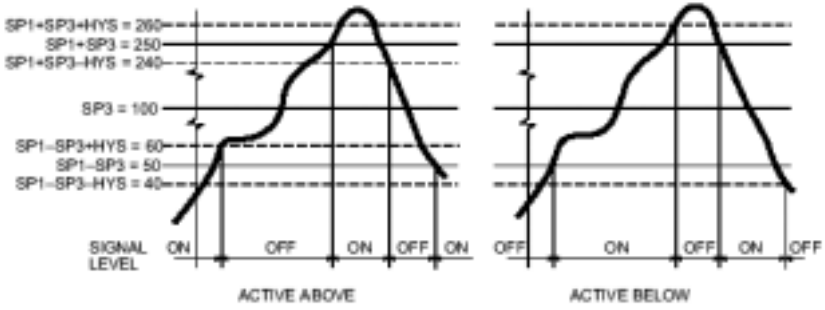


"HI dEV" : High Deviation for both Active Above and Active Below



"LO dEV" : Low Deviation for both Active Above and Active Below

24 Alarm Configuration Menu



"bNd.dEV" : Band Deviation for both Active Above and Active Below

Press '**RESET/ENTER**' 15) Display flashes ***"PROC."*** Process (No Deviation) mode or previous selection.

Press '**▲/MAX**' 16) Scroll 4 available following options for your choice of Alarm Mode: ***"PROC."***(Process Deviation), ***"HI dEV"***(High Deviation), ***"LO dEV"***(Low Deviation) and ***"bNd.dEV"*** (Band Deviation).

24.2. *AL 2.CNF* **Enter ALARM 2 CONFIGURATION MENU:**

Press '**RESET/ENTER**' 17) Display shows ***"StOREd"*** stored message momentarily and then advance to ***"AL 2.CNF"*** Alarm2 configuration submenu. If necessary, Press '**MENU**' to skip and enter the other available following submenu: ***"AL db"*** Alarm Deadband Configuration, ***"NUM.dLy***" Number of display/reading configuration, ***"RSt AL"*** Alarm Reset Submenu.

Press '**RESET/ENTER**' 18) To enter ***"AL 2.CNF"*** Alarm 2 configuration which all menu items are identical with ***"AL 1.CNF"*** Alarm1 configuration menu. Use '**RESET/ENTER**' and '**MAX**' buttons to setup Alarm 2 Functions or Press '**MENU**' to skip it and enter ***"AL db"*** Alarm Deadband setup menu.

24.3. *AL db* **Enter ALARM DEADBAND MENU:**

This selected deadband (hysteresis) for Alarm 1 (***"SP3"***) and Alarm 2 (***"SP4"***) is placed on the INACTIVE side of the selected levels. This results in immediate action (if zero (0) delay is selected in ***"NUM.dLy"***) When an alarm limit is exceeded, but defers recovery when the input returns to pre-alarm levels.

Press '**MENU**'	19) Display shows ***"AL db"*** Alarm Deadband setup menu.
Press '**RESET/ENTER**'	20) Display shows some 4-digit number (0020 as default) of previous settings with the first digit flashing.
Press '▲**/MAX**' & ' ▶**/MIN**'	21) To modify the value of Alarm Deadband for your desired setting.
Press '**RESET/ENTER**'	22) Display shows ***"StOREd"*** stored message momentarily and then advances to ***"NUM.dLy"*** Number of input readings required triggering Alarm 1 (SP3) and Alarm 2 (SP4) action.

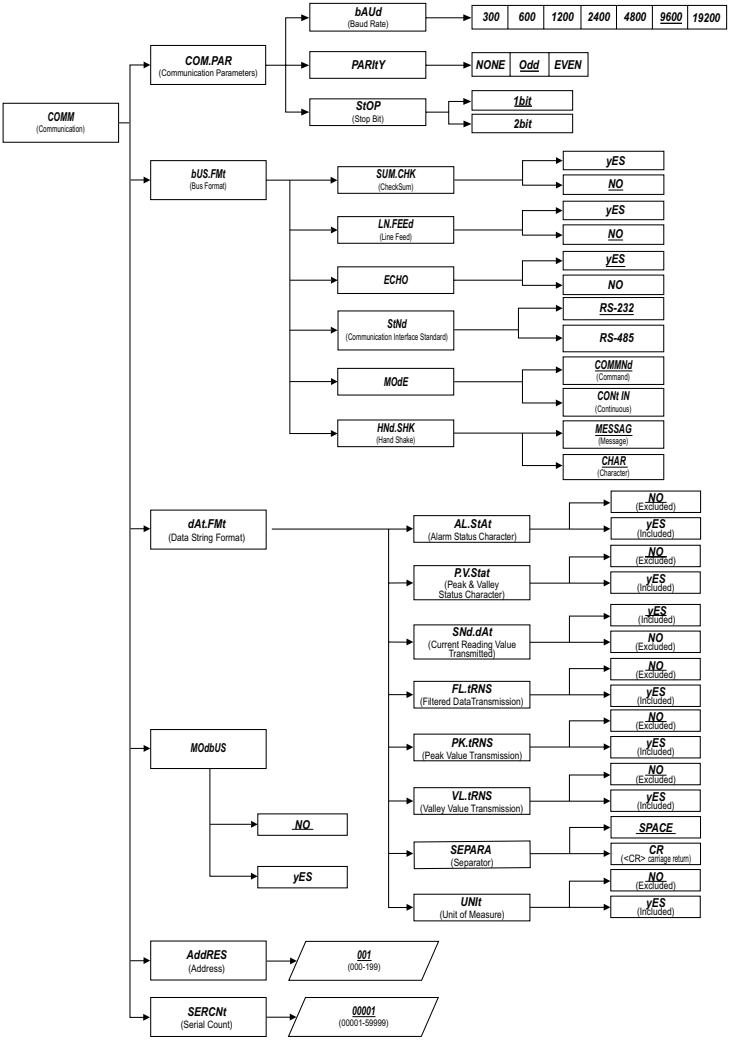
24.4. *NUM.dLy* **Enter NUMBER OF READINGS/DISPLAY MENU:**

Press '**RESET/ENTER**'	23) Display shows two 2-digit numbers (***03 03*** as default) with the second right side of display) one flashing.
Press '▲**/MAX**'	24) To modify the delay value or number of input readings before Alarm 2 response.
Press '▶**/MIN**'	25) To select Alarm 1's delay value setting, display flashing the first 2-digit number (left side of the display). Pressing '**MIN**' button allow users to select Alarm 1 or Alarm 2's delay values.
Press '▲**/MAX**'	26) To modify the delay value or number of input readings before Alarm 1 response.
Press '**RESET/ENTER**'	27) Display shows ***"StOREd"*** stored message momentarily and then advances to ***"RSt AL"*** Alarm Reset submenu.

24.5. *RSt AL* **Enter ALARM RESET CONTROL MENU:**

Press '**RESET/ENTER**'	28) Display flashes ***"dISAbL"*** (disable) or previous setting.
Press '▲**/MAX**'	29) To enable ***"ENAbLE"*** or disable ***"dISAbL"*** both Alarm 1 and Alarm 2 (Setpoints 3 and 4) action and LEDs.
Press '**RESET/ENTER**'	30) Display shows ***"StOREd"*** stored message momentarily and then advances to ***"COMM"*** Communication parameter setting menu.

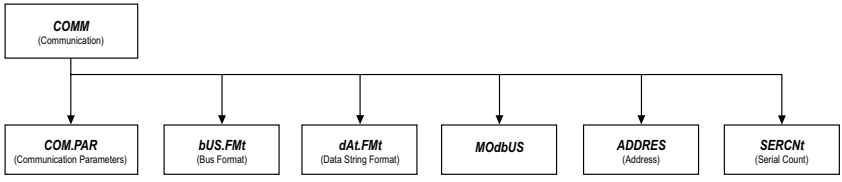
25 COMMUNICATION CONFIGURATION FLOWCHART



26 COMMUNICATION MENU CONFIGURATION: (*COMM*)

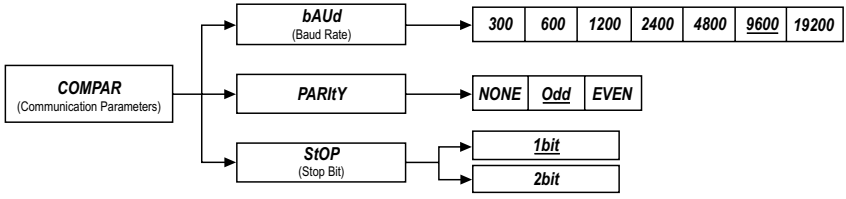
Communication Operation Requirement: Communication Option Board must be installed as either equipped by model or by user-option add-on upgrade.
Purchasing the controller with Serial Communications permits an instrument or more meters to be configured or monitored remotely from an IBM PC compatible computer using **software available from the website or on the CD-ROM enclosed with your shipment.** For complete and detail instructions for the use of the Communication Option, refer to the Serial Communication Reference Manual.

- **Installation:** The communication board you ordered, as option upgrade must be plugged into main board via socket J11 next to the power transformer with on-board connector P11. Refer to Option Board Locations and Installation **Section 5.2.2**.
- Push-Button Menu Configuration will be inaccessible during Serial Communication.



Main Communication Configuration Menu Flowchart

COMM	**Enter COMMUNICATION CONFIGURATION MENU:**
Press '**MENU**' Press '**RESET/ENTER** Press '**MENU**'	1) 7 times until display shows ***"COMM"*** Communication Configuration Menu. 2) Display shows ***"COM.PAR"*** Communication Parameter Setting Submenu. 3) If necessary, Select the other available following sequential submenu items: ***"bUS.FMt"***, ***"dAt.FMt"***, ***"MOdbUS"***, ***"AddRES"***, and ***"SERCNt"*** for your desired setup or press '**RESET/ENTER**' to enter ***"COM.PAR"*** Communication Parameter Setting Submenu.



26 Communication Menu Configuration

26.1 COM.PAR **Enter COMMUNICATION PARAMETERS SUBMENU:**

Allows the user to adjust and modify Serial Communication Parameters settings of the instrument. When connecting an instrument to a computer or other device, the communication parameters must match with each other. Generally the default settings should be utilized.

bAUd

Press '**RESET/ENTER**'	4) Display shows ***" bAUd"*** Baud Rate setting submenu. If necessary to select other available following submenus: ***"PARIty"***, ***"StOP"***, use or press the '**MENU**' button.
Press '**RESET/ENTER**'	5) Display flashes ***"009600"*** (default) or previous setting of baud rate.
Press '**▲/MAX**'	6) Scroll through the available following baud rate: ***"000300"***, ***"000600"***, ***"001200"***, ***"002400"***, ***"004800"***, ***"009600"*** and ***"019200"*** for your desired setting.

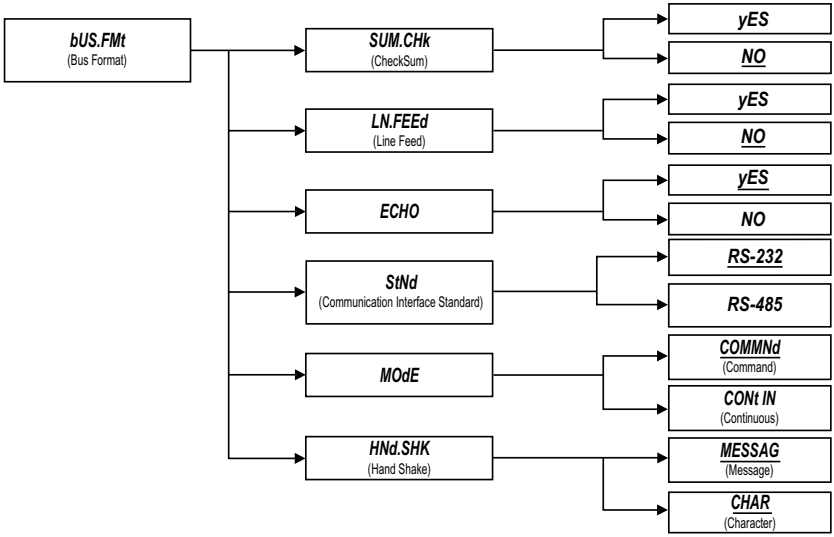
PARIty

Press '**RESET/ENTER**'	7) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"PARIty"*** Parity setting submenu.
Press '**RESET/ENTER**'	8) Display flashes ***"_Odd"*** Odd (default) option or previous setting.
Press '**▲/MAX**'	9) Scroll through the following available options: ***"_Odd"***, ***"NONE"*** and ***"EVEN"*** for your desired setting.

StOP

Press '**RESET/ENTER**'	10) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"StOP"*** Stop Bit setting submenu.
Press '**RESET/ENTER**'	11) Display flashes ***"1b It"*** 1-Bit or previous setting.
Press '**▲/MAX**'	12) Scroll through and select 2 available following options: ***"1b It"*** (1-Bit) or ***"2b It"***(2-Bit).
Press '**RESET/ENTER**'	13) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"bUS.FMt"*** Bus Format submenu.

26.2 *bUS.FMt* **Enter COMMUNICATION BUS FORMAT SUBMENU:**



Bus Format determines Communication Standards and Command/Data Formats for transferring information into and out of the controller via the Serial Communication Bus. Bus Format submenus essentially determine how and when data can be accessed via the Serial Communications of the device.

SUM.CHK

Press '**RESET/ENTER**' 14) Display shows ***"SUM.CHk"*** Check Sum setting submenu. If necessary to select the other available following Bus Format Setting submenus: ***"LN.FEEd"***, ***"ECHO"***, ***"StNd"***, ***"MODE"***, and ***"HNd.SHk"***, use or press the **'MENU'** button.

Press '**RESET/ENTER**' 15) Display flashes ***"NO"*** No (checksum excluded) option as default or previous selection.

Press '▲**/MAX**' 16) Scroll through or select either two available options: ***"NO"*** to exclude or ***"yES"*** to include the checksum with Input Reading Data.

LN.FEEd

Press '**RESET/ENTER**' 17) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"LN.FEEd"*** Line Feed setting submenu.

- Line Feed setting determines if data sent from the controller will have a Line Feed appended to the end or following all <CR>'s – useful for viewing or logging results on separate lines when displayed on communications software at a computer.

Press '**RESET/ENTER**' 18) Display flashes ***"NO"*** No (Line Feeds excluded) option as default or previous selection.

Press '▲**/MAX**' 19) Scroll through or select either two available options: ***"NO"*** to exclude or ***"yES"*** to include the line feeds with Reading Data.

ECHO

Press '**RESET/ENTER**' 20) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"ECHO"*** Line Feed setting submenu.

- When valid commands are sent to the instrument, this determines whether the command will be echoed to the Serial Bus. Use of "ECHO" is recommended in most situations, especially to help verify that data was received and recognized by the controller.

Press '**RESET/ENTER**' 21) Display flashes ***"yES"*** Yes (enable Echo responding from controller) option as default or previous selection.

Press '▲**/MAX**' 22) Scroll through or select either two available options: ***"yES"*** to enable Echo response or ***"NO"*** to disable Echo response from Controller to Serial Bus.

StNd **Serial Communication Interface Standard Submenu:**

The following are the supported Communication Interface Standards: RS-232, RS-485 Half duplex and RS-485 Full duplex.

Press '**RESET/ENTER**' 23) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"StNd"*** Serial Communication Interface Standard submenu.

Press '**RESET/ENTER**' 24) Display flashes ***"RS-232"*** RS-232 Serial Communication Interface Standard as default or previous selection.

Press '▲**/MAX**' 25) Scroll or select only two types: ***"RS-232"*** Standard of Point-to-Point Operation Class (one meter) or ***"RS-485"*** RS-485 Standard of Multi-Point Operation Class (more than one meter) for your choice of Communication Operation Class.

- ***"RS-232"*** RS-232 Standard is Point-to-Point Operation Class which supports full duplex, direct connection between two (and only two) devices for data exchanges, short distances and moderate data rate such as the meter and your digital computer. No addresses are used unless the meter is programmed for a "one meter bus".
- This controller, whether is setup with default RS-232 Serial Communication or not, must be inspected visually for proper jumper configuration of Communication RS232/RS485 Standard on Communication Option Board And match it with this Menu Configuration before attempting to communicate. Refer to Serial Communication Option Manual.
- ***"RS-485"*** Standard of Multi-Point Communication Operation Class shared wiring for a Data Terminal Equipment (DTE as host device or computer) and more than one Data Communication Equipment (DCE as meter/controller with compatible communications), designates a "Bus". Several panel meters and a personal computer can share a bus, with the computer serving as controller. The controller can acquire data by transmitting the preassigned address for a meter followed by a command for the meter to send selected information. When used, the meter(up to 32 meters) can share a bus (with addresses from 0 to decimal 199); all meters receive the data when the address is ***"00"***.
- This ***"RS-485"*** option must be setup along with the jumper configuration on the Communication Option Board to insure proper communication for your selected-Communication Interface Standard.

MODE

Press '**RESET/ENTER**' 26) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"MOdE"*** Data Flow Mode submenu.

- Data Flow Mode determines whether the instrument will wait for commands and data requests from Serial Bus- as defined as ***"COMMNd"*** Command Mode or will send data automatically and continuously to the Serial Bus-as differently defined as ***"CONt IN"*** Continuous Mode.
- Devices configured for the RS-485 Communication Standard operate properly only under Command Mode.

Press '**RESET/ENTER**' 27) Display flashes ***"COMMNd"*** Command Mode as default or previous selection.

Press '**▲/MAX**' 28) Scroll and select either only two available Modes ***"COMMNd"*** Command Mode or ***"CONt IN"*** Continuous Mode for your choice of setting.

HNd.SHk

Press '**RESET/ENTER**' 29) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"HNd.SHk"*** Hand Shake Method submenu.

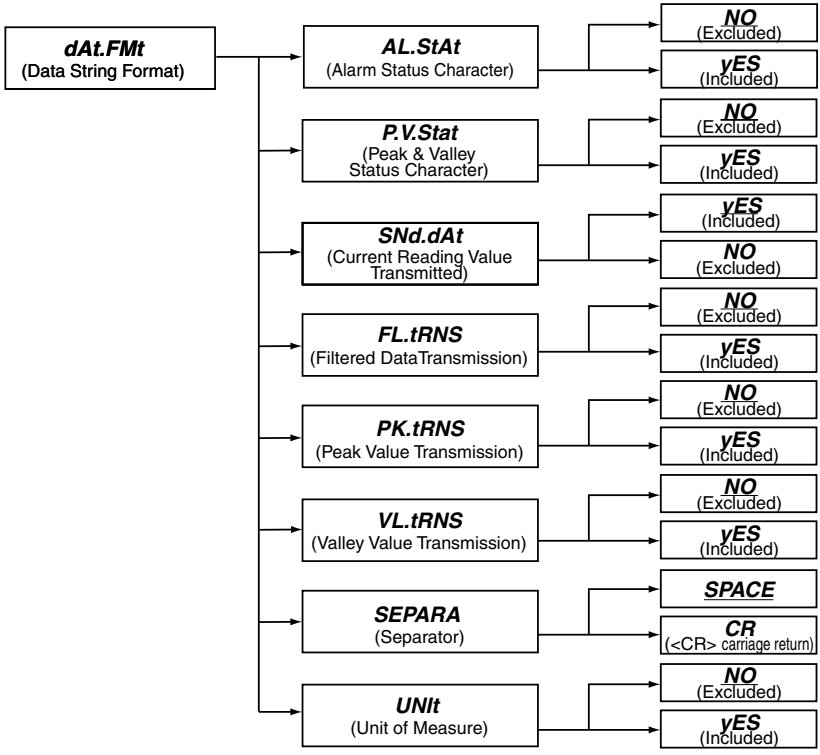
- Message Hand Shake: The RTS (Request To Send) line from the host controller is checked when the device is ready to send measurement data. If the RTS is true, it sends the complete message data without interruption even if RTS goes false in the middle of transmission. If RTS is false, it skips sending the data completely and continues with the next measurement.
- Character Hand shake: The device checks the RTS input before sending each character and sends characters only while RTS is true. It always completes sending the data before transferring the latest reading to the output buffer.
- No RTS handshaking is available with Multi-point Operation Class.

Press '**RESET/ENTER**' 30) Display flashes ***"MESSAG"*** Message Hand Shake Method as default or previous selection.

Press '**▲/MAX**' 31) Scroll or Select either only two following methods ***"MESSAG"*** Message Hand Shake or ***"CHAR"*** Character Hand Shake for your choice of setting.

Press '**RESET/ENTER**' 32) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"dAt.FMt"*** Data Format Configuration Submenu.

26.3 ***dAt.FMt*** **Enter COMMUNICATION DATA FORMAT SUBMENU**



- With this ***"dAt.FMt"*** Data Format Configuration Submenu, user can select and setup all the parameters to be transmitted via the optional (RS-232 /RS-485) Serial Communication Board.

AL.StAt

Press '**RESET/ENTER**' 33) Display show ***"AL.StAt"*** Alarm Status Character setting submenu. If necessary to select the other available following Bus Format submenus: ***"P.V.StAt"***, ***"tyP.dAt"***, ***"FL.tRNS"***, ***"Pk.tRNS"***, ***"VL.tRNS"***, ***"SEPARA"*** and ***"UNIt"***, use or press the '**MENU**' button.

- For Universal meters, there is a list of the transmitted character (Hex number value) corresponding for each of the sixteen (16) possible Setpoint/Alarm (SP1, SP2, AL1/SP3 and AL2/SP4) states. Refer to STATUS CHARACTER FORMATS/Alarm Status Characters Chapter of Serial Communications Option Manual for detail description and listing Table.

Press '**RESET/ENTER**' 34) Display flashes ***"NO"*** No (Alarm Status Character excluded from Data String as default) option or previous selection.

Press '▲**/MAX**' 35) Scroll or select either ***"NO"*** to exclude or ***"yES"*** to include Alarm Status Character in Data String Format for your choice of setting.

P.V.StAt

Press '**RESET/ENTER**' 36) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"P.V.StAt"***
Peak & Valley Character Setting Submenu.

- The meter keeps track of Peak and Valley changes at the completion of each measurement, so the occurrence of new values can be signaled. However, transmissions of Peak/Valley status may be commanded less often: therefore, the meter also monitors if Peak or Valley values have changed since the last status transmission.
- These Characters only applies for Universal meters. Refer to STATUS CHARACTER FORMATS/Peak & Valley (Hi/Lo) Status Characters Chapter of Serial Communications option Manual for detail description and listing Table.

Press '**RESET/ENTER**' 37) Display flashes ***"NO"*** No (the Character Excluded as default) option or previous selection.

Press '▲**/MAX**' 38) Scroll and select either ***"NO"*** or ***"yES"*** to exclude or include the character from Data String Format.

SNd.dAt

Press '**RESET/ENTER**' 39) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"SNd.dAt"*** Current Reading Value Transmission submenu that allows user to select whether or not the data string transmitted is included with current reading.

Press '**RESET/ENTER**' 40) Display flashes, ***"yES"*** as included the current reading value in data string as default or previous selection.

Press '▲**/MAX**' 41) Scroll and select either ***"yES"*** to include or ***"NO"*** to exclude current reading in data string transmitted.

FL.tRNS

Press '**RESET/ENTER**'	42) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"FL.tRNS"*** Filtered Data Transmission Switch Submenu that allows user to select whether or not filtered data to be transmitted as part of Data String.
Press '**RESET/ENTER**'	43) Display flashes ***"NO"*** No (not transmitted as default) option or previous selection.
Press '▲**/MAX**'	44) Scroll and select ***"NO"*** to exclude or ***"yES"*** to include filtered data transmission for choice of setting.

PK.tRNS

Press '**RESET/ENTER**'	45) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"Pk.tRNS"*** Peak Value Transmission submenu that allows user to select whether Peak Value to be included or excluded in the Date String.
Press '**RESET/ENTER**'	46) Display flashes ***"NO"*** No (excluded as default) option or previous selection.
Press '▲**/MAX**'	47) Scroll and select ***"NO"*** to exclude or ***"yES"*** to include Peak Value in the Data String for choice of setting.

VL.tRNS

Press '**RESET/ENTER**'	48) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"VL.tRNS"*** Valley Value Transmission submenu that allows user to select whether Valley Value to be included or excluded in the Date String.
Press '**RESET/ENTER**'	49) Display flashes ***"NO"*** No (excluded as default) option or previous selection.
Press '▲**/MAX**'	50) Scroll and select ***"NO"*** to exclude or ***"yES"*** to include Valley Value in the Data String for choice of setting.

SEPARA

Press '**RESET/ENTER**' 51) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"SEPARA"*** Separator Selection submenu that determines whether different data types included in Data String and sent from the device will be separated by spaces or by Carriage Returns.

Press '**RESET/ENTER**' 52) Display flashes ***"SPACE"*** Space separator as default or previous selection.

Press '**▲/MAX**' 53) Scroll and select ***"SPACE"*** or ***"CR"*** <CR> Carriage Return Option for your choice of Data String Format.

UNIt

Press '**RESET/ENTER**' 54) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"UNIt"*** Unit of Measure submenu that allows user to include user-Defined unit of measurement in Data String Format (For detail and description of how to create your own units of measurement, refer to Serial Communication Operation Manual).

Press '**RESET/ENTER**' 55) Display flashes ***"NO"*** No (excluded as default) option or previous selection.

Press '**▲/MAX**' 56) Scroll and select ***"NO"*** to exclude or ***"yES"*** to include your own defined unit of measure in the Data String for your choice of Data Format.

26.4. *MOdbUS* **Enter MODBUS PROTOCOL SUBMENU**

Press '**RESET/ENTER**' 57) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"MOdbUS"*** Modbus Protocol submenu.

Press '**RESET/ENTER**' 58) Display flashes ***"NO"*** No option as default as Modbus Protocol disabled or previous selection.

Press '**▲/MAX**' 59) Scroll and select ***"NO"*** to disable or ***"yES"*** to enable Modbus protocol.

- If Modbus Protocol was selected, the following Communications Parameters must be set as: No Parity, 8-bit Data Bit, 1-Stop Bit. Do not attempt to change these parameters.

26.5 ***AddRES*** **Enter ADDRESS SELECTION SUBMENU**

Press '**RESET/ENTER**' 60) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"AddRES"*** Address selection submenu.
- This menu is applicable to the RS-485 Option only to designate different address for each device or controller in the Multi-point Serial Communication network that allows hosting device to recognize and communicate properly as labeling or naming purposes.

Press '**RESET/ENTER**' 61) Display flashes ***"001"*** Address Value 1 as default.
Press '▲**/MAX**' & '►**/MIN**' 62) To modify and select Address Value for your choice of setting. This controller supports value within 000 – 199.

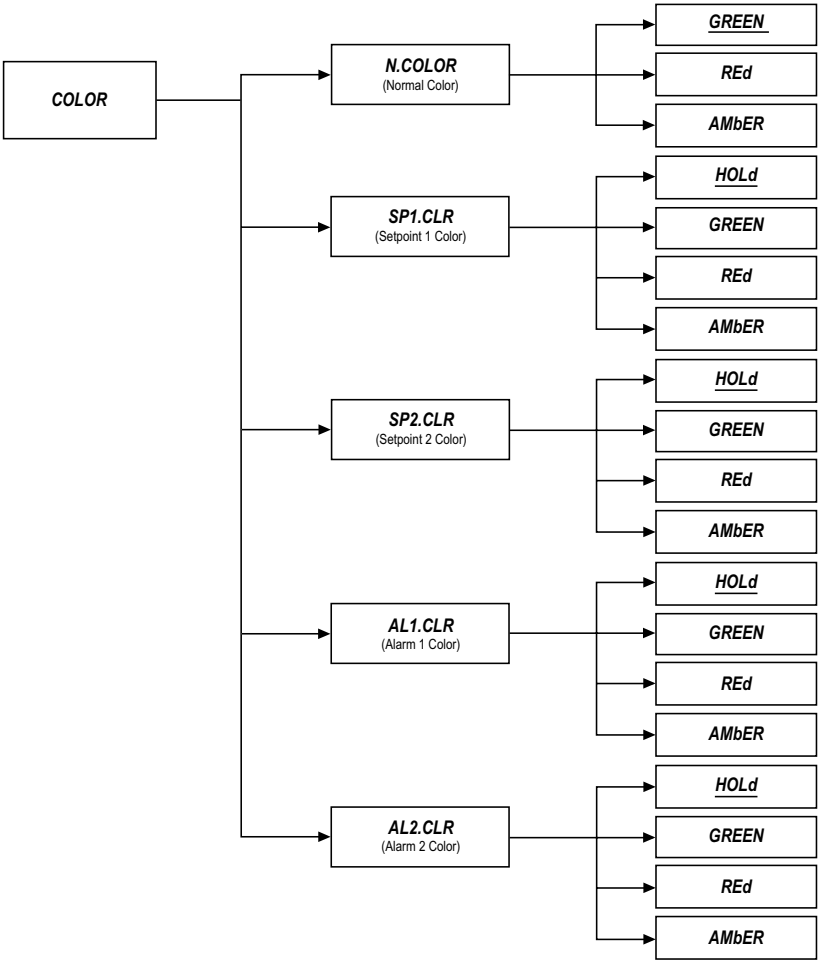
26.6. ***SERCNt*** **Enter SERIAL COUNT SUBMENU**

Press '**RESET/ENTER**' 63) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"SERCNt"*** Serial Count submenu.
- Serial Count menu is used to program the number of readings the meter just take (programmable from ***"00001"*** to ***"59999"***) between transmissions of data via the Serial Communication Option Board.

Caution: For proper communication, do not set Serial Count Value at ***"00000"***.

Press '**RESET/ENTER**' 64) Display flashes ***"00001"*** as default Serial Count value.
Press '▲**/MAX**' & '►**/MIN**' 65) To modify and select the desired value of Serial Count (number of readings) between data transmissions.
Press '**RESET/ENTER**' 66) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"COLOR"*** LED Color Select submenu.

27 DISPLAY COLOR SELECTION MENU FLOWCHART:

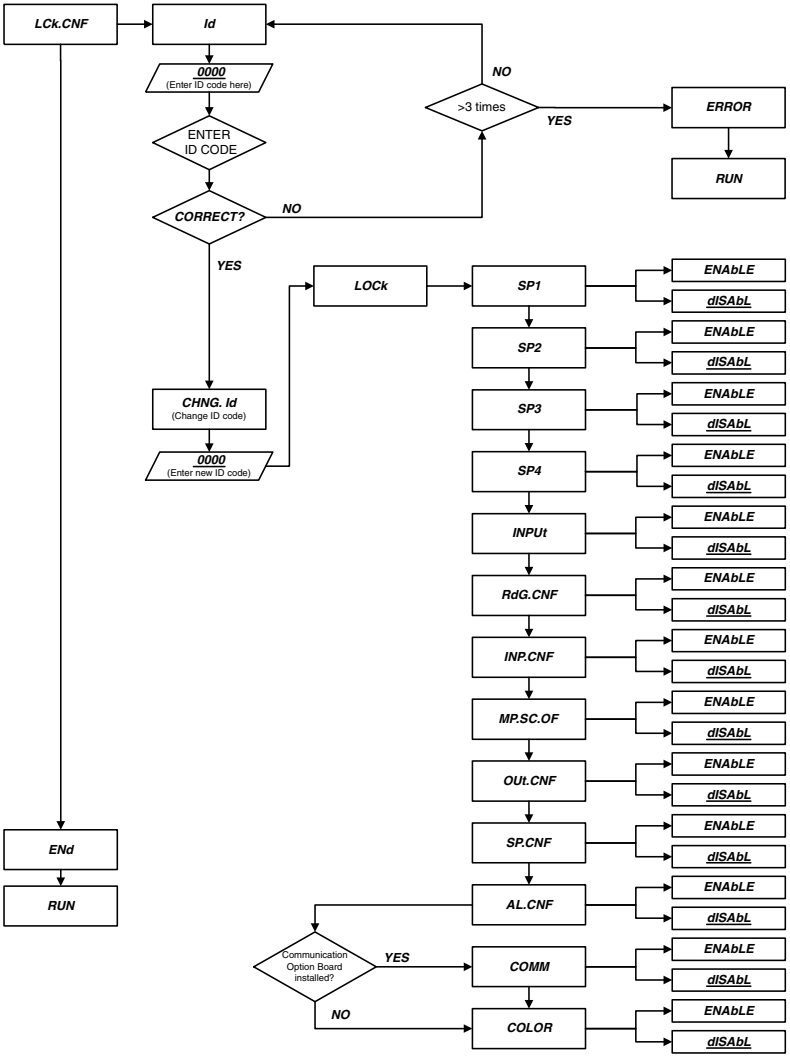


28 DISPLAY COLOR SELECTION MENU: (COLOR)

COLOR	**Enter COLOR SELECTION MENU:**
Press '**MENU**'	1) Nine times, if Communication Option Board installed, otherwise just eight times. Display shows ***"COLOR"*** Color Selection Menu that allows user to select the color of the LED display for either normal mode or under alarmed condition.
28.1 *N.COLOR*	**Enter NORMAL COLOR SUBMENU**
Press '**RESET/ENTER**'	2) Display shows ***"N.COLOR"*** Normal Color submenu that allows user to change normal Display's color. If necessary to access the other following submenus: ***"SP1.CLR"***, ***"SP2.CLR"***, ***"AL1.CLR"*** or ***"AL2.CLR"***. Use or Press '**MENU**' button.
Press '**RESET/ENTER**'	3) Display flashes ***"GREEN"*** Green color (default) or previous selection.
Press '▲**/MAX**'	4) Scroll through the available following colors: ***"GREEN"***, ***"REd"*** or ***"AMbER"*** for your color choice of Display. • The four following menus allow the user to change the color of display when setpoint is reached or alarm is triggered.
28.2 *SP1.CLR*	**Enter SETPOINT 1 COLOR SUBMENU**
Press '**RESET/ENTER**'	5) Display shows ***"StOREd"*** stored momentarily and advances to ***"SP1.CLR"*** Setpoint 1 Color submenu.
Press '**RESET/ENTER**'	6) Display flashes ***"HOLd"*** Hold option (default), which causes the display color remains the same as the setpoint reached, or previous selection.
Press '▲**/MAX**'	7) Scroll and select the following available options: ***"HOLd"***, ***"GREEN"***, ***"REd"*** or ***"AMbER"*** for your choice of display color.
28.3 *SP2.CLR*	**Enter SEPOINT 2 COLOR SUBMENU**
Press '**RESET/ENTER**'	8) Display shows ***"StOREd"*** stored momentarily and advances to ***"SP2.CLR"*** Setpoint 2 Color submenu. • The menu items and configuration steps of following submenus: ***"SP2.CLR"*** Setpoint 2 Color submenu
28.4 *AL1.CLR*	**Enter ALARM 1 COLOR SUBMENU *"AL1.CLR"***
28.5 *AL2.CLR*	**Enter ALARM 2 COLOR SUBMENU *"AL2.CLR"***
	"AL1.CLR" and ***"AL2.CLR"*** are identical to the above ***"SP1.CLR"*** Setpoint 1 Color submenu steps. Therefore refer it as the example for setting Display Color Functions.

29 Lockout (Access Security) Configuration Menu Flowchart

29 LOCKOUT (ACCESS SECURITY) CONFIGURATION MENU FLOWCHART:



30 LOCKOUT (ACCESS SECURITY) CONFIGURATION MENU

- To prevent unauthorized tampering with the setup parameters, this instrument provides protection by requiring the user to enter the ID (Access Security) Code before allowing access any locked menu item on Main menu.
- The locked menu will be skipped and invisible during Menu Navigation, however Display will show the locked setpoint and value but editing mode is disabled (first digit is not flashing).
- Whether multiple or single menu accessibility/restriction desired, there is only one ID code needed.

LCk.CNF	**ENTER LOCKOUT (ACCESS SECURITY) CONFIGURATION MENU:**
Press '**MENU**'	1) Ten times, Display shows ***"LCk.CNF"*** Lockout (Access Security) Configuration Menu.
Press '**RESET/ENTER**'	2) Display shows ***"Id"*** Access Security ID menu.
Press '**RESET/ENTER**'	3) Display shows 4 numbers 0 (***0000***) with the first digit flashing.
Press '▲**/MAX**' & ' ▶**/MIN**'	4) To enter Access Security ID code. • The default code is any 4-digit number that has the sum of its 4 digits equal 10. For example 1234 is one of the default ID code since 1+2+3+4 = 10. • Use numbers that are easy for you to remember. If the ID Code is forgotten or lost, Call customer service with your serial number to access and reset to the default ID code.
Press '**RESET/ENTER**'	5) Display shows ***"CHNG. Id"*** Change ID Code menu; which Implies that the ID code, was just entered, is accepted otherwise the meter will return to ***"Id"*** ID Code menu and allows user enter the ID code again if the correct ID code still is not found for over 3 attempts then display shows ***"ERROR"*** and advances to ***"RUN"*** Run mode.
Press '**RESET/ENTER**'	6) Display shows 4 numbers 0 (***0000***) with the first digit flashing.
Press '▲**/MAX**' & ' ▶**/MIN**'	7) To modify and enter new ID code if necessary, otherwise skip this menu by Press '**RESET/ENTER**' again.

30 Lockout (Access Security) Configuration Menu

LOCk

Press '**RESET/ENTER**' 8) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"LOCk"*** Lockout menu.

Press '**RESET/ENTER**' 9) Display shows ***"SP1"*** Setpoint 1 submenu. If necessary, use '**MENU**' button to regain accessibility or lockout the other following menu functions in the Main Menu: ***"SP2"***, ***"SP3"***, ***"SP4"***, ***"INPUt"***, ***"RdG.CNF"***, ***"INP.CNF"***, ***"MP.SC.OF"***, ***"OUt.CNF"***, ***"SP.CNF"***, ***"AL.CNF"***, ***"COMM"*** (If Communication Option Board installed), and ***"COLOR"***.

Press '**RESET/ENTER**' 10) Display flashes ***"dISAbL"*** disable option or previous setting.

Press '**▲/MAX**' 11) Scroll and select ***"ENAbLE"*** to lockout ***"SP1"*** Setpoint 1 from any unauthorized modification or skip this menu, just Press '**RESET/ENTER**'.

Press '**RESET/ENTER**' 12) Display shows ***"StOREd"*** stored message momentarily and then advances to the ***"SP2"*** submenu that allows user to lockout or regain access controlling Setpoint 2 level.

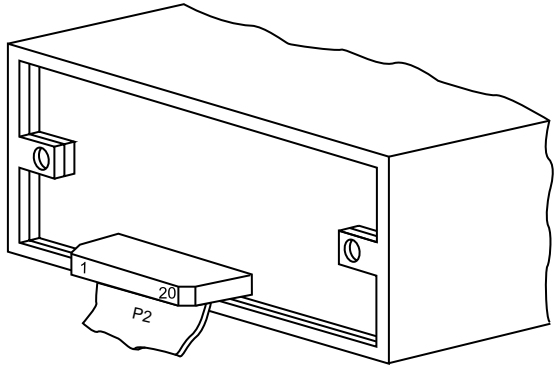
- To lockout these following sequential submenus, refer to the above steps. These menus have the identical setup procedure and items as submenu ***"SP1"*** Setpoint 1:

  "SP2": Setpoint 2
  "SP3": Setpoint 3
  "SP4": Setpoint 4
  "INPUt": Input Selection
  "RdG.CNF": Reading Configuration
  "INP.CNF": Input Configuration
  "MP.SC.OF": Multi Scale & Offset
  "OUt.CNF": Output Configuration
  "SP.CNF": Setpoint Configuration
  "AL.CNF": Alarm Configuration
  "COMM": Communication Configuration
  "COLOR": Color Selection.

31 EXTERNAL CONTROL LINES

P2, the 20-pin connector at the rear of the main board, connects to the setpoint transistor collectors and permits remote control of significant meter features.

The meter case label gives the names (abbreviated functions) of each of the twenty pins of P2, the center-bottom connector. Refer to **Figure 30-1**.



P2

TARE(T)	1	2	PEAK (P)
VALLEY (V)	3	4	SWLIN2
EXT. RESET	5	6	N/C
DIG RTN	7	8	+5V
DISPLAY HOLD	9	10	LOCKOUT EEPROM & MENU PUSH BUTTON
RESET ALARM	11	12	NONSTANDARD RX
NONSTANDARD TX	13	14	N/C
+V EXT	15	16	SP1
SP2	17	18	AL1
AL2	19	20	RTN EXT

Figure 30-1. Connector Label Detail

31.1 TARE (PIN 1)

Tare is available when P2-1 and P2-4 are connected to a momentary contact switch. This feature allows you to automatically zero your meter when the switch is activated. Tare is not available for temperature meters.

31.2 PEAK (PIN 2)

When this is connected to P2-4 by an external switch, the meter displays the stored PEAK (“***HI RDG***”) value rather than the current reading. The display flashes to distinguish this value.

31 External Control Lines

31.3 VALLEY (PIN 3)

When this is connected to P2-4 by an external switch, the meter displays the stored valley (“***LO RDG***”) value rather than the current reading. The display flashes to distinguish this value.

31.4 SWLIN2 (PIN 4)

Completes the circuit for any of the above three signals.

31.5 $\overline{\text{EXTERNAL RESET}}$ (PIN 5)

Connecting this to ground (P2-7) causes a “**HARD**” **RESET** (when you see *“**RESET2**”* on the display).

31.6 NO CONNECTION (PIN 6)

31.7 DIGITAL RETURN (PIN 7)

This is a non-isolated return to be used for the digital controls provided on this P2 connector.

WARNING: THIS METER RETURN IS NOT ISOLATED FROM THE SIGNAL INPUT AND SHOULD NOT BE CONNECTED TO EXTERNALLY-GROUNDED DEVICES UNLESS ISOLATION IS PROVIDED EITHER AT THE SIGNAL INPUT OR AT THIS EXTERNAL-LOGIC CONNECTION.

31.8 +5 V (PIN 8)

Up to 20 mA is available for driving external devices, but isolation should be provided if there is a possibility of common mode (ground) currents, since this supply is NOT isolated from the signal input.

31.9 $\overline{\text{DISPLAY HOLD}}$ (PIN 9)

Grounding this pin to P2-7 freezes the display value. However, the meter continues to take new samples and update the other outputs, such as Analog Output, Setpoints/Alarms, and Peak/Valley.

31.10 $\overline{\text{LOCKOUT EEPROM}}$ (AND ‘MENU’ BUTTON) (PIN 10)

Grounding this pin to P2-7 stops any configuration changes and new storage into the non-volatile memory, and when in run mode does not allow entry into the setup mode when the ‘**MENU**’ button is pressed.

31.11 $\overline{\text{RESET}}$ OF ALARMS (PIN 11)

Grounding this pin to P2-7 causes the alarm latches to reset.

31.12 NONSTANDARD RX (PIN 12) AND NONSTANDARD TX (PIN 13)

These two pins allow digital communications with the meter using 5 V CMOS logic levels and RS-232 protocols and format. This access is normally reserved for specialized equipment communication in a calibration lab or at the factory.

31.13 NO CONNECTION (PIN 14)

31.14 +V EXT (PIN 15)

This is the pin on which to bring in isolated external 5 to 30 V to power the snubbing diodes of the four setpoint/alarm open-collector transistors.

31.15 SP1 (PIN 16)

The open-collector of the first setpoint transistor (can carry 150 mA).

31.16 SP2 (PIN 17)

The open-collector of the second setpoint transistor (can carry 150 mA).

31.17 AL1 (PIN 18)

The open-collector of the third setpoint (first alarm) transistor (can carry 150 mA).

31.18 AL2 (PIN 19)

The open-collector of the fourth setpoint (second alarm) transistor (can carry 150 mA).

31.19 RTN EXT (PIN 20)

This is the return to the external ground (P2-20) of the external power for the setpoint transistors and snubbing diodes brought in on P2-15, 16, 17, 18 and 19. **Figure 30-2** shows an example of a circuit using an external relay with SP1 (Setpoint 1). If a solid state relay is used, delete connection to Pin 15.

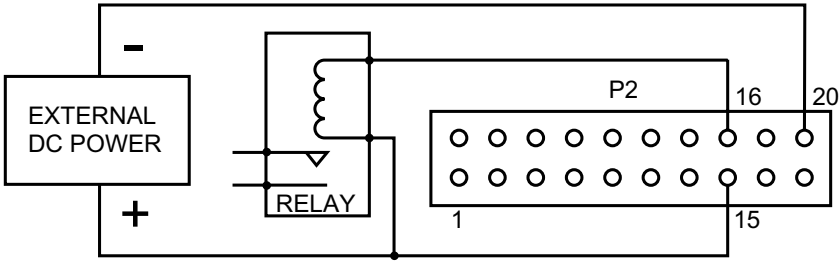


Figure 30-2 For Setpoint Transistors

32. TROUBLESHOOTING - DISPLAY MESSAGES AND TROUBLESHOOTING GUIDE

A flashing alpha-numeric message in the display generally indicates an incorrect combination of jumpers and/or configuration values.

32.1 ERROR MODE MESSAGES

32.1.1 Flashing *"999999"* (Numerical Overflow)

The maximum number of counts in the display cannot exceed –99999 or 999999. If, by moving the ACTIVE decimal point one or more places to the left, you cause the display to move beyond the maximum number of counts it is capable of showing (for example, 12345.0 to 12345.00), the display will indicate the overflow by flashing "**999999**".

32.1.2 Flashing *"ERR 01"* (Offset Overflow)

When an offset value has been entered and then the ACTIVE decimal point has been moved one or more places to the left, causing the offset display reading to move beyond the maximum number of counts it is capable of showing (for example, 1000.00 to 1000.000), the display will go into offset overflow.

Note The meter will only display 6 digits (999999) maximum.

32.1.3 Flashing *"ERR 02"* (Setpoint Overflow)

After a Setpoint (or Alarm) value has been entered and then the ACTIVE decimal point has been moved one or more places to the left, causing the setpoint display reading to move beyond the number of counts it is capable of showing (for example, setpoint at 100.00 and then a decimal point change to 100.0000), the display will indicate the SETPOINT OVERFLOW by momentarily flashing *"**ERR 02**"* before returning to the run mode.

Note The meter will only display 6 digits (999999) maximum.

32.1.4 *"NOSTOR"* and *"STORED"* (Programming Entries In EEPROM)

If you are in the configuration mode and you make a CHANGE to any setup parameter and press the '**RESET**' button, the display will MOMENTARILY flash either "**STORED**" or "**NOSTOR**" and then go to the next menu item.

32.1.5 Flashing *"OVLD"* (Positive Input Overload)

If the input signal exceeds the range selected (for example, 0-100 mV range selected and greater than 200 mV is applied to the input), the display will flash a "**+OVLD**".

32.1.6 Flashing *"OPEN"* (Open Sensor Indication)

Coupled with the proper jumper selection, the display will indicate an open sensor.

32.1.7 Flashing *"-OPEN"* (Open Sensor Indication)

Coupled with the proper jumper selection, a "***-OPEN***" indicates the input is below the bottom limit of the range selected.

32.1.8 Flashing *"I OVSC"* (Input Overscale)

This display occurs when the input scale and/or offset applied to the input signal causes the display to go into a numerical overflow.

32.1.9 Flashing *"R OVSC"* (Reading Overscale)

This display occurs when the reading scale and/or offset applied to the input signal causes the display to go into a numerical overflow.

32.1.10 Flashing *"CB OVF"* (Count By Overflow)

When a display value near the maximum display capability is forced into a numerical overflow by changing the CNT BY menu (for example, the display reads 999997 and the count by is changed from 001 to 005 and rounds the display up to 1000000).

32.1.11 Flashing *"UOM.OVF"* (Unit Of Measure Overflow)

If a unit of measure is selected and you are near the full scale capability of the display and in the ACTIVE decimal mode, the display will shift one digit to the left (for example, to a display of 1065.33 you add a unit of measure such as "F" for a display of 1065.33F), the display will flash "***UOM.OVF***".

32.1.12 Flashing *"dP OVF"* (Decimal Point Overflow)

If number of Decimal Points Setup was improperly configured.

32.2 TROUBLESHOOTING GUIDE

"***99999***"	
POSSIBLE CAUSE:	Active decimal point change driving the display into numerical overload.
TO CORRECT:	Check the decimal poinit and set the required decimal point.
"***ERR 01***"	
POSSIBLE CAUSE:	Active decimal in "***RDG.CNF > DEC.PT > DP.ACTV***" has been selected and/or DEC PT (decimal point) position has been moved one or more places to the left driving the programmed offset value into numerical overflow.
TO CORRECT:	Check the decimal poinit and set the required decimal point. Alternately, the amount of RDG.OF may be reduced to get the decimal point further to the left.

continued next page

32 Troubleshooting

"ERR 02"	
POSSIBLE CAUSE:	Active decimal has been selected and/or DEC PT (decimal point) position has been moved one or more places to the left driving the programmed Setpoint value into numerical overflow.
TO CORRECT:	Display will flash ***"ERR 02"*** message for a short period of time, then automatically correct the setpoint's decimal point position and move to the next menu item. Press the '**SETPT**' button until the meter displays flashing ***"999999"***. Then press the '**MAX**' button to reset the display to ***"000000"*** and enter a new valid setpoint value.
"OVLD"	
POSSIBLE CAUSE:	The positive input CURRENT & VOLTAGE exceeds the input range selected.
TO CORRECT:	Check both the input range and the actual input to find the error condition and either reduce the input or change jumpers to a higher input range for more input attenuation.
POSSIBLE CAUSE:	In the LINEAR (RTD) mode, input signal exceeds 690 ohms or jumpers S1-A,B or S1-C,D or S1-E,F are installed and the input signal exceeds 6900 ohms. (Place the active decimal point all the way to the right side: "FFFFFF.").
TO CORRECT:	Check both the input range and the actual input to find the error condition. To correct, either reduce the input or change jumpers to a higher input range for input attenuation.
"-OVLD"	
POSSIBLE CAUSE:	The negative input voltage exceeds the input range selected.
TO CORRECT:	Check both the input range and the actual input to find the error condition and either reduce the input or change jumpers to a higher input range for more input attenuation.
"OPEN"	
POSSIBLE CAUSE:	Input sensor is open or broken, or the connection to the meter is open or broken. Input sensor is not wired to the proper inpu terminals.
TO CORRECT:	Check thermocouple or RTD wiring.
"-OPEN"	
POSSIBLE CAUSE:	The input sensor is open or broken, or the connection to the meter is open or broken. The input sensor is not wired to the proper input terminals. The input signal is below the minimum specified (refer to **Section 33**, Specifications).
TO CORRECT:	When jumper S2-E on the signal input board is used, this will be indicated if a sensor lead is broken or otherwise opened. Check thermocouple or RTD wiring.

"I OVSC"	
POSSIBLE CAUSE:	The input scale and/or offset values chosen are large enough to drive the display into numerical overflow.
TO CORRECT:	Reduce the input and/or the input scaling/offset. Refer to *"**IN.SC.OF**"* in **Section 16.4**.
"R OVSC"	
POSSIBLE CAUSE:	The reading scale and/or offset values chosen are large enough to drive the display into numerical overflow.
TO CORRECT:	Reduce the reading scale/offset and/or move the active decimal point to the right. Reducing input scale/offset is not required, because the input overscale message has higher priority than this message and would be displayed if there were an input overscale.
"CB OVF"	
POSSIBLE CAUSE:	CNT BY (count by value) has been changed causing the display to round up to a numerical overflow.
TO CORRECT:	Reduce the *"**CNT BY**"* count by value to 001. If you have an active decimal point selected, move the decimal point one or more positions to the right.
"SERIAL"	
POSSIBLE CAUSE:	A configuring change has been attempted via the front panel buttons while the serial communications port is actively communicating with the meter.
TO CORRECT:	Either disconnect the serial cable, or press **'MENU**' for configuration of the meter.

33 Specifications

33.1 CURRENT INPUT

INPUT RANGES (+10%):	0-20 mA and 4-20 mA
RESOLUTION:	1µA
MAXIMUM INPUT:	200 mA
INPUT OHMS:	5

33.2 VOLTAGE INPUT

INPUT RANGES:				
UNIPOLAR:	100 mV	1 V	10 V	100 V
BIPOLAR:	±50 mV	±0.5 V	±5 V	±50 V
RESOLUTION:	1 µV	10 µV	100 µV	1 mV
MAX INPUT:	70 Vp	350 Vp	350 Vp	300 Vp
INPUT OHMS:	1G	1M	1M	1M
BIAS AMPS:	50 pA	5 pA	1 pA	1 pA

33.3 POTENTIOMETER INPUT

INPUT RANGES:	1 V or 10 V
RESOLUTION:	programmed to 0.001%

33.4 THERMOCOUPLE INPUT

TC Type	Degrees, Temperature : Accuracy		
	Celsius	Fahrenheit	Kelvin
J	-210 to 760 : 0.2	-346 to 1400 : 0.3	+63.2 to 1673.2 :0.2
K	-250 to 1250 : 0.2*	-418 to 2282 : 0.3*	+23 to 977.2 : 0.2*
E	-270 to 1000 : 0.2	-454 to 1832 : 0.3	+3.2 to 1273.2 : 0.2
T	-270 to 400 : 0.2	-454 to 752 : 0.3	+3.2 to 673.2 : 0.2
N	-270 to 1300 : 0.2	-454 to 2372 : 0.3	+3.2 to 1573.2 : 0.2
R	-50 to 1768 : 0.2	-58 to 3214 : 0.3	+223.2 to 2041.2 : 0.2
S	-50 to 1768 : 0.2	-58 to 3214 : 0.3	+223.2 to 2041.2 : 0.2
B	+100 to 1820 : 0.3	+212 to 3300 : 0.3	+373.2 to 2093.2 : 0.3
DINJ	-200 to 900 : 0.6	-328 to 1652 : 1.0	+73.2 to 1173.2 : 0.6

* for K type: temperatures over 1250 deg C, accuracy will be 0.4C / 0.8F / 0.4K

Note ☞

For accurate full scale measurements below -40 degrees, you may need to complete the full scale cold junction calibration procedure (Refer to **Section 16.3.1**, Special Cold-Junction Calibration).

Calibration: NIST #135, DIN 43710

Reference Junction: Either a remote ice-point cell or an oven can be used in place of the Cold-Junction Compensation Board. Curvalinear correction to better than 40 dB ambient temperature rejection.

33.5 RTD INPUT

RTD Type	Temperature : Accuracy	
	Celsius	Fahrenheit
Pt100/NIST	-200 to 850 : 0.2	-328 to 1562 : 0.3
Pt100/DIN	-200 to 900 : 0.2	-328 to 1652 : 0.3
Cu10(Linear)	-200 to 200 : 1.0	-328 to 392 : 2.0

(Either of the two linearizations or the non-linearized scaling may be applied to RTDs with R-zero values as low as 10 ohms or as high as 1000 ohms, using field calibration and selection of excitation and input range.)

33.5 RTD INPUT continued

RESOLUTION:	1, 0.1, 0.01
CURRENT:	160 µA, factory calibrated, auto-compensation
EXCITATION:	1.6 mA, can be field calibrated with EEPROM storage (RTDs or OHMS):
LEAD RESISTANCE (for specified accuracy)	
THERMOCOUPLES:	to 100 ohms, total
2-wire 100 ohm RTD:	50 milliohms/lead
3-wire 100 ohm RTD:	5 ohms/lead, balanced
4-wire 100 ohm RTD:	10 ohms total, unbalanced

33.6 GENERAL

SCALE:	+0.000001 to +500000 or –0.0001 to –99999.
OFFSET:	Zero to +999999
POLARITY:	unipolar/bipolar, programmable
NOISE REJECTION	
NMR:	60 dB, 50 or 60 Hz, + selected filter
CMR:	120 dB
ACCURACY at 25 ºC	
MAX ERROR:	±0.005% of reading
SPAN TEMPCO:	less than 20 ppm/ºC
WARMUP:	55 minutes to rated accuracy. It is recommended that the unit be continuously running to insure its accuracy.
CONVERSION TECHNIQUE:	Delta-Sigma
RESOLUTION:	24-bit A/D
READING RATE:	See **Table 33-1**
DISPLAY LEDs:	red/amber/green 6-digit, 9-segment color changing, 17.3 mm (0.68”) H x 10.2 mm (0.40”) W; 4 alarm indicators; ˚C, ˚F, & ˚K
SYMBOLS:	–.8.8.8.8.8. or 8.8.8.8.8.8
DECIMAL POINT POSITION:	Programmable
SENSOR EXCITATION:	1.5 to 11 Vdc, to 60 mA Max 10 V, to 30 mA 24 V, to 25 mA
OUTPUTS	
STANDARD:	4, isolated open collector; 150 mA at 1 V sink; 30 V open.
ANALOG OUTPUT, OPTIONAL:	0-5 V, 1-5 V, 0-10 V, 0-20 mA, 4-20 mA level; 14-bit resolution; 0.1% accuracy; 6 msec step response.
RELAY OUTPUT, OPTIONAL:	Form -C, SPDT Relays
POWER RATING FOR RESISTIVE LOADS:	Two relays at P6 and P7 30Vdc or 250 Vac @ 5 Amp Two relays at P18A and P18B 30 Vdc or 250 Vac @ 3 Amp (see **Figure 5-9**)

33 Specifications

TURNDOWN RATIO
(MAX OFFSET-MIN SPAN): 1000 with 0.1% or 100 with 0.01% resolution

NETWORK AND COMMUNICATIONS,OPTIONAL:

ETHERNET:	Standards Compliance IEEE 802.3 10Base-T
SUPPORTED PROTOCOLS:	TCP/IP, ARP, HTTPGET, TELNET
RS-232 / RS-422 / RS-485 / MODBUS:	Selectable from menu; both ASCII and modbus protocol selectable from menu. Programmable 300 to 19.2 K baud; complete programmable setup capability; program to transmit current display, alarm status, min/max, actual measure input value and status.
RS-485 (HALF AND FULL DUPLEX):	Addressable from 0 to 199

ISOLATION
POWER TO INPUT / ANALOG, COMM, ETHERNET, & RELAY OUTPUT:
2500 Vac per 1 min. test
RELAYS TO INPUTS / ANALOG, COMM, & ETHERNET OUTPUTS:
2500 Vac per 1 min. test
ETHERNET TO INPUTS / ANALOG OUTPUTS:
1500 Vac per 1 min. test
BETWEEN INPUTS / ANALOG & COMM OUTPUTS:
500 Vac per 1 min. test

POWER

AC VOLTAGES:	90-240 Vac
AC FREQUENCY:	50/60 Hz
CONSUMPTION:	8.5 watts, max
EXTERNAL FUSE PROTECTION REQUIRED:	IEC127-2/III, 250 mA (Time-Lag) or UL Slow-Blow

ENVIRONMENTAL

OPERATING TEMP RANGE:	0 to 50 ºC (32 to 140°F)
STORAGE TEMP RANGE:	–40 to 85 ºC (–40 to 202°F)
HUMIDITY:	up to 95% non-condensing at 40°C (104°F)
FRONT PANEL:	NEMA-4 rated

MECHANICAL

DIMENSIONS (H x W x D):	1.89 x 3.78 x 5.86in. (48 x 96 x 145mm)
PANEL CUTOUT (H x W):	1/8 DIN 1.772 X 3.622in. (45 x 92mm)
WEIGHT:	1.2 pounds (448 g)
MATERIAL:	94V-0 UL-rated Polycarbonate

APPROVALS
CE per EN50081-1, EN50082-2, EN61010-1 (see CE APPROVAL SECTION).

1. Test with Analog Out (AN03)

Sample Rate	Process (100 mV) Rate (ms)	TC (K type) Rate (ms)
0	7(135)	7(135)
1	14(68)	14(68)
2	27(36)	27(36)
3	52(19)	41(24)
4	100(10)	41(24)
5	142(7)	41(24)

2. Test with Communication (Baud Rate at 19200 bps, Continuous Mode)

Sample Rate	Process (100mV) Rate (ms)	TC (K type) Rate (ms)
0	7(135)	7(135)
1	14(68)	14(68)
2	27(36)	27(36)
3	52(19)	33(30)
4	71(14)	33(30)
5	71(14)	33(30)

3. Test with Command Mode (Baud Rate at 19200 bps, Command Mode)

Sample Rate	Process (100mV) Rate (ms) (Turn Around - Time ms)	TC(K type) Rate (ms) (Turn Around - Time ms)
0	7(135 ms)	7(135 ms)
1	14(68 ms)	14(68 ms)
2	27(36 ms)	28(36 ms)
3	52(19 ms)	28(30 ms)
4	60(14 ms)	28(30 ms)
5	60(14 ms)	28(30 ms)

Table 33-1 Reading Rate

For the Command Mode, if the command-sending turn-around time is shorter than the turn-around time in the above table (Refer to Process or TC), the response will have some duplicate readings. For example, if the sample rate is 1 in process, the command-sending turn-around time should be larger than 68 ms.

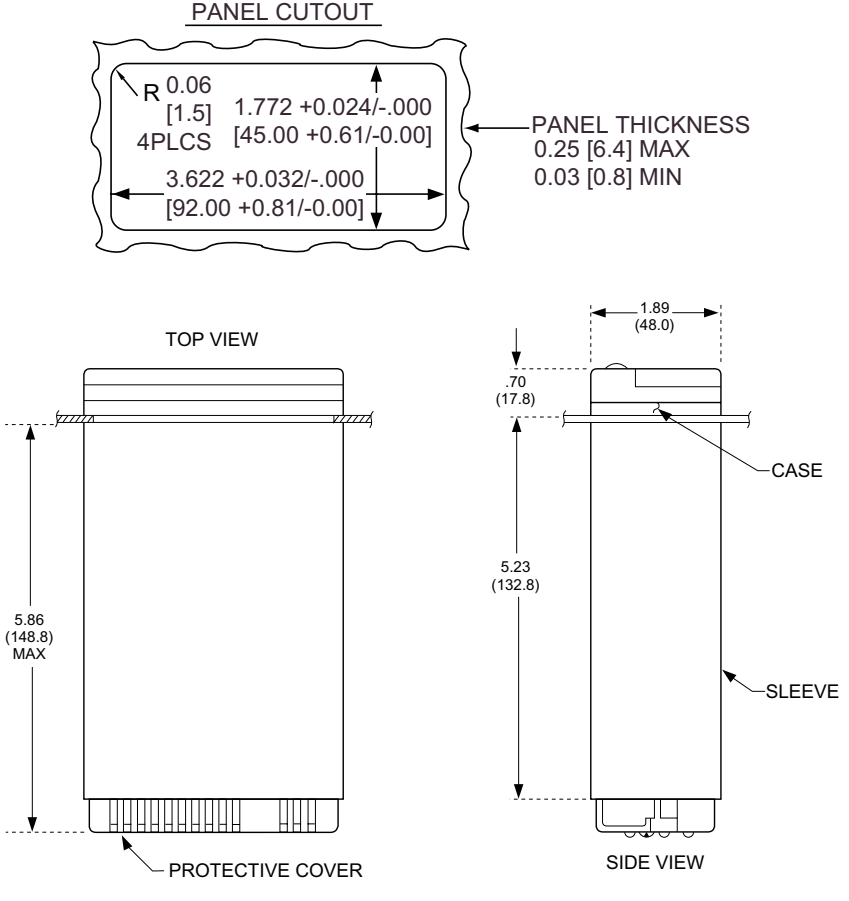


Figure 33-1. Meter Housing and Panel Cutout

33.7 FLASHING MESSAGES:

DURING PROGRAMMING (CONFIGURATION MODE)

NUMERICAL OVERFLOW:	“999999”
OFFSET OVERFLOW:	“ERR 01”
SETPOINT OVERFLOW:	“ERR 02”
NOT STORED IN EEPROM:	“NOSTOR”
VALUE PUT IN EEPROM:	“STORED”

DURING MEASUREMENT (RUN MODE)

INPUT TOO LARGE, POSITIVE:	“OVLD”
INPUT TOO LARGE, NEGATIVE:	“– OVLD”
INPUT OUT OF RANGE, POSITIVE:	“OPEN”
INPUT OUT OF RANGE, NEGATIVE:	“– OPEN”
EXCESS INPUT SCALE/OFFSET:	“I OVSC”
EXCESS DISPLAY SCALE/OFFSET:	“R OVSC”
COUNT-BY DISPLAY OVERFLOW:	“999999”

DURING SETPOINT ADJUST (RUN MODE)

OUT OF SELECTED DIGIT RANGE:	“999999”
NOT STORED IN EEPROM:	“NOSTOR”
VALUE PUT IN EEPROM:	“STORED”

33.8 ITS-90 THERMOCOUPLE TABLES

For complete Thermocouple Tables, please refer to the Technical Reference Section : Thermocouple Reference Data.

This information is located:

http://omega.com/temperature/Z

Temperature Handbooks, Section Z

or

CD-ROM, enclosed with your shipment

33.9 RTD 10 ohm COPPER TABLE

Temp ˚C	Resistance	Temp ˚C	Resistance	Temp ˚C	Resistance	Temp ˚C	Resistance
-200	1.058	-80	5.923	40	10.580	160	15.217
-190	1.472	-70	6.318	50	10.966	170	15.607
-180	1.884	-60	6.712	60	11.352	180	15.996
-170	2.295	-50	7.104	70	11.738	190	16.386
-160	2.705	-40	7.490	80	12.124	200	16.776
-150	3.113	-30	7.876	90	12.511	210	17.166
-140	3.519	-20	8.263	100	12.897	220	17.555
-130	3.923	-10	8.649	110	13.283	230	17.945
-120	4.327	0	9.035	120	13.669	240	18.335
-110	4.728	10	9.421	130	14.055	250	18.726
-100	5.128	20	9.807	140	14.442	260	19.116
-90	5.526	30	10.194	150	14.828		

33.10 ITS-90 RTD 385 TABLE

Temp ˚C	Resistance	Temp ˚C	Resistance	Temp ˚C	Resistance	Temp ˚C	Resistance
-200	18.5201	50	119.3971	320	219.152	590	310.4869
-190	22.8255	60	123.2419	330	222.6849	600	313.708
-180	27.0964	70	127.0751	340	226.2063	610	316.9175
-170	31.335	80	130.8968	350	229.7161	620	320.1155
-160	35.5433	90	134.7069	360	233.2144	630	323.3019
-150	39.7232	100	138.5055	370	236.7011	640	326.4768
-140	43.8764	110	142.2925	380	240.1763	650	329.6401
-130	48.0048	120	146.068	390	243.6399	660	332.7919
-120	52.1098	130	149.8319	400	247.092	670	335.9321
-110	56.193	140	153.5843	410	250.5325	680	339.0608
-100	60.2558	150	157.3251	420	253.9615	690	342.1779
-90	64.2996	160	161.0544	430	257.3789	700	345.2835
-80	68.3254	170	164.7721	440	260.7848	710	348.3775
-70	72.3345	180	168.4783	450	264.1791	720	351.46
-60	76.3278	190	172.1729	460	267.5619	730	354.5309
-50	80.3063	200	175.856	470	270.9331	740	357.5903
-40	84.2707	210	179.5275	480	274.2928	750	360.6381
-30	88.2217	220	183.1875	490	277.6409	760	363.6744
-20	92.1599	230	186.8359	500	280.9775	770	366.6991
-10	96.0859	240	190.4728	510	284.3025	780	369.7123
		250	194.0981	520	287.616	790	372.7139
0	100	260	197.7119	530	290.9179	800	375.704
		270	201.3141	540	294.2083	810	378.6825
10	103.9025	280	204.9048	550	297.4871	820	381.6495
20	107.7935	290	208.4839	560	300.7544	830	384.6049
30	111.6729	300	212.0515	570	304.0101	840	387.5488
40	115.5408	310	215.6075	580	307.2543	850	390.4811

33.11 ITS-90 RTD 392 US TABLE

Temp ˚C	Resistance	Temp ˚C	Resistance	Temp ˚C	Resistance
-200	17.0787	210	180.9644	620	324.1198
-190	21.4575	220	184.6908	630	327.3649
-180	25.8017	230	188.4054	640	330.5983
-170	30.1135	240	192.1082	650	333.8199
-160	34.3948	250	195.7994	660	337.0298
-150	38.6476	260	199.4787	670	340.2279
-140	42.8737	270	203.1464	680	343.4144
-130	47.0747	280	206.8023	690	346.5891
-120	51.2522	290	210.4465	700	349.752
-110	55.4078	300	214.0789	710	352.9032
-100	59.5429	310	217.6996	720	356.0427
-90	63.6587	320	221.3086	730	359.1704
-80	67.7565	330	224.9058	740	362.2864
-70	71.8373	340	228.4913	750	365.3907
-60	75.9022	350	232.0651	760	368.4832
-50	79.952	360	235.6271	770	371.564
-40	83.9876	370	239.1774	780	374.6331
-30	88.0096	380	242.7159	790	377.6904
-20	92.0187	390	246.2427	800	380.736
-10	96.0154	400	249.7578	810	383.7698
0	100	410	253.2611	820	386.7919
10	103.9728	420	256.7527	830	389.8023
20	107.9339	430	260.2326	840	392.8009
30	111.8833	440	263.7007	850	395.7878
40	115.8209	450	267.1571		
50	119.7467	460	270.6017		
60	123.6609	470	274.0346		
70	127.5633	480	277.4558		
80	131.4539	490	280.8652		
90	135.3329	500	284.2629		
100	139.2	510	287.6489		
110	143.0555	520	291.0231		
120	146.8992	530	294.3856		
130	150.7312	540	297.7363		
140	154.5514	550	301.0753		
150	158.3599	560	304.4026		
160	162.1567	570	307.7182		
170	165.9417	580	311.0219		
180	169.715	590	314.314		
190	173.4765	600	317.5943		
200	177.2263	610	320.8629		

34 Factory Preset Values

JUMPER CONFIGURATIONS--
S1 = K
S2 = A, B
S3 = A, C
S4 = NONE

NOTE: extra jumpers are located in storage positions.

INPUT SELECTION : INPUt
VOLTAGE: VOLt
Voltage type = UNIPOL
Range = 100MV
If choose bI POL
Range = 50MV
If choose different INPUt--
If tC: Type = J tC
If Rtd: Type = 2Pt.392
If CURRNt: Range = 0-20MA

READING CONFIG : RdG.CNF
Rd.SC.OF = dISAbL
If choose ENAbLE = dIRECt

UNt.tMP = C

dEC.Pt
dP.ACtV=yES
SEtdP=FFFFFF

FILtER
CNtby=001
FILt.tP=A.b.C.FIL
FILt.tM=016

FLS.dSP
SP1.FLS=dISAbL
SP2.FLS= dISAbL
AL1.FLS= dISAbL
AL2.FLS= dISAbL

bRIGHt=H.bRt

INPUT CONFIGURATION : INP.CNF
LIN.FRE=60

Ad.RAtE=0

MOdE
If Choose tC:
tC.CO.JC=ENAbLE
C.JUN.OF-dISAbL

If Choose bRIdGE:
bRDG.LM=NORMAL
RAtIO=dISAbL

IN.SC.OF=dISAbL

OUTPUT CONFIGURATION : OUt.CNF
ANA.OUt = dISAbL
If Choose ENAbLE:
MOdE = VOLt
OUt.tYP= UNFILt

SETPOINT CONFIG: SP.CNF
SP CNF=dISAbL
If choose ENAbLE
SP1.CNF:
ACtIVE=AbOVE
N.StAtTE=N.OPEN

SP2.CNF:
ACtIVE=bELOU
N.StAtE=N.OPEN

SPdb=0200

ALARM CONFIGURATION : AL.CNF
AL.CNFG = dISAbL
If ENAbLE:
AL1.CNF
ACtIVE = AbOVE
LAtCH = UNLtCH
N.StAtE = N.OPEN
AL.MOdE

AL2.CNF:
ACtIVE = BELOU
LAtCH = UNLtCH
N.StAtE = N.OPEN
AL.MOdE

AL db = 0020

NUM.dLy = 0303

RSt AL = dISAbL

COMMUNICATION CONFIG : COMM:
COM.PAR
BAUd = 9600
PARIty = Odd
StOP = 1bIT

bUS.FMt
SUMCHk = NO
LN.FEEd = NO
ECHO = yES
STNd = RS-232
MOdE = CMMNd
HNd.SHk = MESSAG

dAt.FMt
AL.StAt = NO
P.V.StAt = NO
SNd.dAt = yES
FL.tRNS = NO
Pk.tRNS = NO
VL.tRNS = NO
SEPARA = SPACE
UNIt = NO

COMM (continued)

MOdbUS = NO

AddRES = 001

SERCNt = 00001

LED COLOR SELECTION : COLOR
N.COLOR=GREEN
SP1.CLR=HOLd
SP2.CLR=HOLd
AL1.CLR=HOLd
AL2.CLR=HOLd

LOCKOUT CONFIG : LCk.CNF
(ALL DISABLED)
SP1
SP2
SP3
SP4
INPUt
RdG.CNF
INP.CNF
MP.SC.OF
OUt.CNF
SP.CNF
AL.CNF
COMM
COLOR

35 Record Your Setup Values

JUMPER CONFIGURATIONS--
S1 =
S2 =
S3 =
S4 =

INPUT SELECTION : INPUt
If choose VOLt UNIPOL,Range =
If choose bI POL, Range =
If tC: Type =
If Rtd: Type =
If CURRNt: Range =

READING CONFIG : RdG.CNF
Rd.SC.OF =
If choose ENAbLE =

UNt.tMP =

dEC.Pt
dP.ACtV=
SEtdP=

FILtER
CNtby=
FILt.tP=
FILt.tM=

FLS.dSP
SP1.FLS=
SP2.FLS=
AL1.FLS=
AL2.FLS=

bRIGHt=

INPUT CONFIGURATION : INP.CNF
LIN.FRE=

Ad.RAtE=

MOdE
If Choose tC:
tC.CO.JC=
C.JUN.OF-
If Choose bRIdGE:
bRDG.LM=
RAtIO=

IN.SC.OF=

OUTPUT CONFIGURATION : OUt.CNF
ANA.OUt =
If Choose ENAbLE:
MOdE =
OUt.tYP=

SETPOINT CONFIG: SP.CNF
SP CNF=
If choose ENAbLE
SP1.CNF:
ACtIVE=
N.StAtTE=
SP2.CNF:
ACtIVE=
N.StAtE=

SPdb=

35 Record Your Setup Values

ALARM CONFIGURATION : AL.CNF

AL.CNFG =
If ENAbLE:
AL1.CNF
ACtIVE =
LAtCH =
N.StAtE =
AL.MOdE

AL2.CNF:
ACtIVE =
LAtCH =
N.StAtE =
AL.MOdE

AL db =

NUM.dLy =

RSt AL =

COMMUNICATION CONFIG : COMM:

COM.PAR
BAUd =
PARIty =
StOP =

bUS.FMt
SUMCHk =
LN.FEEd =
ECHO =
STNd =
MOdE =
HNd.SHk =

dAt.FMt
AL.StAt =
P.V.StAt =
SNd.dAt =
FL.tRNS =
Pk.tRNS =
VL.tRNS =
SEPARA =
UNIt =

COMM (continued)

MOdbUS =

AddRES =

SERCNt =

LED COLOR SELECTION : COLOR

N.COLOR=
SP1.CLR=
SP2.CLR=
AL1.CLR=
AL2.CLR=

LOCKOUT CONFIG : LCk.CNF

(ALL DISABLED)
SP1
SP2
SP3
SP4
INPUt
RdG.CNF
INP.CNF
MP.SC.OF
OUt.CNF
SP.CNF
AL.CNF
COMM
COLOR

CE APPROVAL INFORMATION

1. Electromagnetic Compatibility (EMC)

This device comforms with requirements of EMC Directive 89/336/EEC, amended by 93/68/EEC. This instrument complies with the following EMC Immunity Standards as tested per EN 50082-2, 1995 (Industrial environment)

Phenomena	Test Specification	Basic Standard
Electrostatic Discharge	+/- 4 kV contact discharge +/- 8 kV air discharge	IEC 1000-4-2 Performance Criteria B
Radio Frequency electromagnetic field.	27 - 1000 MHz 10 V/m 80% AM (1 KHz)	IEC 1000-4-3 Performance Criteria A
Radio Frequency electromagnetic field. Pulse modulated.	900 MHz 10 V/m 50% Duty cycle @ 200 Hz	IEC 1000-4-3 Performance Criteria A
Fast Transients	+/- 2 kV (ac mains) +/- 1 kV (dc, signal I/O) 5/50 ns Tr/Th, 5 KHz rep. freq.	IEC 1000-4-4 Performance Criteria B
Radio Frequency conducted	0.15 - 80 MHz 10 V/m 80% AM (1 KHz)	IEC 1000-4-6 Performance Criteria A

This instrument complies with the following EMC Emission Standards as tested per EN 50081-1, 1992 (Residential, Commercial and Light Industrial)

Phenomena	Frequency Range	Limits	Basic Standard
Radiated Emission	30-230 MHz 230-1000 MHz	30 dB_V/m at 10 m 37 dB_V/m at 10 m quasi peak	CISPR 22 Class B
Conducted Emission	0.15-0.5 MHz 0.5-5 MHz 5-30 MHz	66-56 dB_V quasi peak 56 dB_V quasi peak 60 dB_V quasi peak	CISPR 22 Class B

2. Safety

This device conforms with Low Voltage Directive 73/23/EEC, amended by 93/68/EEC. The following LVD requirements have been met to comply with EN 61010-1, 1993 (Electrical equipment for measurement, control and laboratory use)

1. Pollution Degree 2
2. Installation Category II
3. Double Insulation
4. Class I Equipment (90-240 Vac Powered Units)

Warranty/Disclaimer

NEWPORT Electronics, Inc. warrants this unit to be free of defects in materials and workmanship for a period of **one (1) year** from the date of purchase. In addition to NEWPORT's standard warranty period, NEWPORT Electronics will extend the warranty period for **four (4) additional years** if the warranty card enclosed with each instrument is returned to NEWPORT.

If the unit should malfunction, it must be returned to the factory for evaluation. NEWPORT's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by NEWPORT, if the unit is found to be defective it will be repaired or replaced at no charge. NEWPORT's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of NEWPORT's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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Direct all warranty and repair requests/inquiries to the NEWPORT Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO NEWPORT, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM NEWPORT'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting NEWPORT:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult NEWPORT for current repair charges. Have the following information available BEFORE contacting NEWPORT:

1. P.O. number to cover the COST of the repair,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

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